MUSEUM.

FROM THE BRITISH CRITIC.

A Description of the Shetland Islands, comprising an Account of their Geology, Scenery, Antiquities, and Superstitions. By Samuel Hibbert, M.D. F.R.S.E., &c. *With a Geological Map, Plates, &c.* 4to. pp. 636. 3*l.* 3*s.* Boards. Edinburgh, Constable & Co.; London, Hurst & Co. 1822.

Among the benefits which accrue to society from the impulse that has been lately communicated to geological pursuits in this country, we may reckon the deliberate survey of the more insulated and remote portions of the empire, by men of education and discernment. We have seen, for example, that Dr. Macculloch, stimulated by the excitements of his favourite study, and waiving considerations of personal comfort and safety, has been enabled to present to the public, as the result of his labours, an interesting analysis of the structure and statistics of the Hebrides; and had the learned author of the volume before us never directed his attention to the contemplation of the mineral kingdom, he might, perhaps, never have set foot on the islands which he has described. We learn, indeed, from himself, that his original object was merely to publish the substance of his geological researches in Shetland, accompanied by an illustrative Essay on Stratification; and that the more popular notices of scenery, manners, and antiquities, were subsequently suggested and adopted. These collateral details, however, are kept distinct from those of a scientific complexion, and are printed on a larger type. We cannot impute blame to Dr. Hibbert for endeavouring to give to his observations the most attractive form: but he would not, in our apprehension, have been more remote from the accomplishment of his aim, had he extended them to the meteorology, botany, and zoology of the region which he undertook to delineate; and had he moulded his disjointed materials into a more regular and consecutive series. Among the other difficulties attendant on his survey, was the total want of any thing like an accurate chart of the islands; a deficiency which compelled him to climb almost every high land in the country, and, with the aid only of a pocket-compass, to obtain a new draft, suited to his purpose. Accordingly, his map differs from those of his predecessors; and, though not free, as he conceives, from many imperfections, it is sufficiently accurate in a geological point of view. He mentions in respectful terms the encouragement and assistance which he derived from Professor Jameson and Dr. Brewster; and, after some general references to authorities, he concludes his preliminary notice with this very unnecessary apology:

"I may also be permitted to observe, that while this work was in the press, a new novel by the 'Great Unknown' was announced, with the notice that the scene was laid in Shetland. Among the many reasons that I have had for regretting the present publication, in its enlarged plan, it is assuredly not the least of them, that

this volume must appear contemporaneous with The Pirate; for, in adverting to the scenery and manners of this country, I am sensible that I cannot fail to provoke a comparison which must be highly to my disadvantage. Still, we owe so many obligations to the author of Waverley, for the pleasure he has afforded us in perusing his works, that an author ought not to complain if he has incautiously brought himself into such a dilemma as to stand as a mere foil to the greatest of all modern masters of description."

We must really beg leave to demur to the relevancy of this modest plea, inasmuch as the cool recorder of existing facts and usages is no fair object of comparison with the novelist; who, even when he adopts history as the basis of his narrative, is accustomed to draw freely on his resources of taste and imagination.

Prefixed to the journal, (or, to use the Doctor's technical phraseology, to the *Iters,*) is a somewhat voluminous Essay on Stratification; the object of which is to convey, at least as far as it regards the geology of Shetland, more precise and accurate notions of the term than are commonly entertained. With this view, he treats first of the molecules of the compact structure of rocks; secondly, of granular particles; thirdly, of concretions; fourthly, of massive portions; fifthly, of veins; and, sixthly, of mountain-masses. His proposed limitation of the expression *granular particles*, to such minute portions of mineral matter as do not exceed the average magnitude of grains of sea-sand, may probably conduce to greater exactness than has been hitherto attempted, but will in most instances imply a restriction of the original import of the epithet *granular*, and still leave the line of demarcation between *grains* and *concretions* somewhat vague and ambiguous. The *granular* structure is here farther distinguished into the *crystalline, semi-crystalline*, and *arenaceous;* as the *concretionary* is into the *crystalline, semi-crystalline, concentrically laminar, amygdaloidal, irregular, fragmentary*, and *organic:* examples of which will readily occur to the geological reader. It is observed that the speculative reasonings, which may be applied to the history of these respective modes of structure, are now freed from the trammels of either the Huttonian or the Wernerian theory; Laplace's more comprehensive doctrine of a condensation of gaseous matter equally embracing the agency of fire and water; or the principles of chemical affinity accounting for the production of crystalline and spheroidal concretions, during the fluidity of the base in which they are contained. The internal arrangement of the particles, however, does not necessarily imply a reciprocal and equal degree of attraction for one another, subsisting at all their points of mutual contact; the state of cohesion seeming, on the contrary, to vary at different points. The author proposes "that the simple term *Structure* should be limited to the expression of the mere circumstance of cohesion subsisting among the component particles of a rock. When, however, an order or arrangement under which such particles coalesce is implied, such, for instance, as is generally denoted by the terms Tabular, Foliated, Laminated, or Schistose, the expression of INTERNAL ARRANGEMENT of STRUCTURE is in every respect distinctive and precise."

The leading views of stratification, with which we are here presented, do not materially differ from those of De Saussure and D'Aubuisson: but an important circumstance is superadded, namely, that of "a linear direction of particles in each laminated or foliated plane." Considerable perplexity and obscurity may, it is surmised, be avoided

by applying the epithet *definite* to that stratification the layers of which are parallel, or nearly so, to one another; or which may be uniformly referred to some determinate point of the compass;—the term *promiscuous*, when no such determinate reference can be made;—and *partial*, when the strata occur in patches, or include small insulated areas. The polyedrous internal arrangement of structure is characterized by a resemblance to the disposition of crystalline lamina meeting under determinate angles:—but the tendency of cross seams or fissures to form, with the seams of stratification, massive portions, more or less symmetrical, is not easily explained.

After having rejected the Wernerian and the Huttonian theories of the formation of mineral veins, Dr. Hibbert inclines to the more recent opinion of Professor Jameson that they are chemical secretions from the rocks which they traverse, and, consequently, contemporaneous with them. This hypothesis is attended with fewer difficulties than any that have been proposed: but it is scarcely reconcileable with the received doctrine of the priority of one vein that is crossed by another. The Doctor presumes that the elements of both the primary and secondary rocks were deposited from water, but that the former were consolidated by the powerful aid of chemical affinities, and the latter by slower deposition, a more reduced state of chemical agency, and mechanical pressure: yet still the ambiguous nature of basalt, and some of the trapp-rocks and porphyries, remain as stumbling blocks, unless the combined operations of terrestrial and submarine volcanos be supposed adequate to explain the phænomena. From an approximative estimate of the nature and proportions of the chemical ingredients of rocks, in the order of their super-position, he is induced to assign, out of twelve parts, about seven of silex, two and a half carbonate of lime, one and a half alum, one-fourth carbonate of magnesia, one-fourth potass, and one-half adventitious and inappreciable matters. In his cursory remarks on the variations of density in the different portions of the crust of the earth, and on the intervals which appear to have taken place between the respective deposits of which it is composed, we discern nothing that has not been already advanced more in detail. Having demonstrated the insufficiency of the Wernerian assumptions of universal formations and distributions, he proceeds to consider the partial ranges of different descriptions of rock, and the want of uniformity which has been observed in the order of their super-position. By supposing, with Professor Jameson, that granite is neither the oldest nor the newest of the primary rocks, but contemporaneous with the strata in which it is imbedded, or with which it is associated, we may get rid of some of the perplexities in which this department of geology is involved: but various enigmatical appearances would still remain to be explained, and particularly that of patches of strata included in widely extended unstratified masses.

The remainder of the Essay contains several pertinent but obvious remarks, which do not require to be specifically stated. We proceed, therefore, to accompany Dr. Hibbert on his first *Iter*, which includes his progress from Leith to Dunrossness, in Shetland, or *Hialtlandia*, as he more than once denominates that assemblage of islands. An orator, in his exordium, generally contrives to exaggerate the importance of the theme of his declamation: but this learned tourist has perhaps erred in the opposite extreme, and needlessly underrated the

principal object of his mission: at least we feel inclined to place above the rank of a *drudge* the faithful observer of geological phænomena, who prosecutes his inquiries without reference to theory; and we presume that the *petromanians*, as he terms them, will not readily concur in the persuasion that a long journey, purely *geognostical*, and when enlivened by the seductive charms of hypothesis, is a service of *insufferable tædium*. He informs us that the passage from Leith to Shetland is accomplished, with a fair wind, in fifty hours: but vessels are often compelled by adverse winds to take shelter in some harbour on the coast of Scotland. The numerous small towns, which diversify the shores of Fife, are pleasing additions to the landscape, when viewed from the sea: but they are contemplated to most advantage at a respectful distance.

Fair Island, the largest of the Shetland group, and that which the author first approached, is associated with some interesting traditions relative to the adventures of the Duke de Medina, who commanded the Spanish armada; and who, with two hundred of his men, having escaped from the perils of shipwreck, effected a landing on this island. From the unarmed natives, they might have obtained by force the provisions for which they liberally paid: but this generous conduct was met by the inhabitants with various acts of perfidy and murder. The prospect of immediate famine induced the illustrious stranger to apply for subsistence and protection to Andrew Umphrey, of Berry, who lost no time in repairing to the relief of the unfortunate Spaniards.

"The vessel appears to have touched at Quendal Bay, the nearest point in the Mainland of Shetland. This was with a view to the superior accommodation due to the illustrious rank of the Duke, which the house of a worthy Scottish gentleman afforded, of the name of Malcolm Sinclair.

"The Duke de Medina landed in the complete costume of a Spanish nobleman, with a view to impress on the simple islanders some notion of the rank which he held in his own country. On being introduced to his host, he was received with the unfeigned welcome that was due to an illustrious and an unfortunate stranger. This feeling was not, however, wholly unmixed with Malcolm's conscientious disapproval of the cause which led eventually to the Duke's disaster, though he wished, at the same time, that emotions of this nature should intrude themselves as little as possible, so as to interfere with the rites of hospitality. An intention so laudable was soon put to a trial,—particularly when the Duke, in order to satisfy himself of the imposing effect which his appearance might have caused in the country, bade his interpreter inquire, if his host had seen before a person of his rank and mien. Malcolm Sinclair, who, in estimating the consequence of his guest, had ever considered him as the redoubted champion of Great Babylon, bluntly replied in broad Scots, 'Farcie in that face! I have seen many prettier men hanging on the Burrow-Muir.' It was well for the feelings of the Spanish commander, that his interpreter's knowledge of the English tongue had not yet extended to its provincialities, and that it was impossible to translate this coarse reply."

A vessel was at length equipped, to convey the Duke and his reduced party to the Continent; and, in the course of a few days, they were landed at the port of Dunkirk, when the Spanish commander rewarded his deliverer with 3000 marks.

On approaching the shores of Dunrossness, the *Mainland*, one of the principal islands, gradually unfolds in perspective, and the nakedness and desolation of the scene are poorly relieved by the number and

* "Sir Robert Sibbald's Account of Shetland.—'*Farcie* in that face,' i. e. '*unsightliness* is in that face, or it is an *ill-favoured* face,'—an uncouth term of opprobrium, very properly obsolete.—'*Burrow-Muir*,' the ancient Tyburn of Edinburgh."

moderate elevation of the hills. In good weather, however, groups of fishing boats impart an appearance of animation to the waters, while the leathern jerkins and boots of the fishermen remind the spectator of the ancient garb of the Scandinavians. The first question usually put to a stranger, on landing, is the price of meal at Leith; an important article of information to the poor natives, whose scanty and precarious crops are seldom adequate to their subsistence.—In their ordinary discourse, their prevailing accent is more assimilated to that of the English, or the Irish, than to that of the Scots.

The sand-drifts about Sumburg Head recall the suggestions of former travellers relative to fixing the moving surface by the binding roots of plants: but the author, as if freshly imported from Erin's green isle, observes that "the *seeds* which grew among the sands were, for the laudable purpose of *making besoms, still dug up by the roots.*"

On the mention of a copper medal of Vespasian found in the parish of Dunrossness, Dr. H. introduces some remarks on the dark and early period of the history of Shetland and Orkney. These northern islands were but imperfectly known to the Romans till the year 84 of the Christian æra, when Agricola reduced the Orkneys, and descried *Foula*, or *Thule,—dispecta est et Thule.* The subdued Orcadians are supposed to have been of Celtic origin, and to have deserted their settlement about a century and a half after Agricola's expedition. In a subsequent period, Orkney, and probably Shetland, suffered under a Gothic tribe of Saxon rovers, who were discomfited by Theodosius, in the year 368: to whom succeeded, in or before the sixth century, a Scandinavian horde, the progenitors of the present inhabitants. Although some of these historical topics are little susceptible of clear and satisfactory elucidation, they are treated by Dr. Hibbert with no mean display of antiquarian research.—From the records of the olden time, his progress to Quendal again summons us to the ravages of sand-showers, and to the contrast of a spot of gay fertility and verdure, enlivened by numerous cottages and a white house, occupied by the intelligent and hospitable Mr. Ogilvie, who has the merit of having introduced an improved style of agriculture. Most of the Shetland cottages are covered with turf and straw, and have the fire-place in the middle of the floor, with a large opening for the egress of the smoke and the admission of light: but windows begin to be more generally used than in former years, and some of the houses were very early provided with chimneys. The cow-house frequently adjoins and leads to the dwelling place, while a turf-partition sometimes distinguishes the latter from the dormitory: but a few coarse blankets or straw, for bedding, are occasionally placed in any convenient corner. A cumbrous wooden chair, or two, designed for the heads of the family, and a few bare benches, form the heavy furniture.—The natives, especially the males, are middle-sized, light, nimble, and well proportioned, with small smooth features, a florid complexion, brown, white, or auburn hair, indicative of their Scandinavian origin, and blue, black, or hazel, but by no means *sea-green* eyes; though, according to the grave testimony of the late Principal Gordon, such were prevalent in Orkney, but which other observers have not been able to discover. The men manifest activity in few pursuits but fishing, devolving most occupations of drudgery on the women; who, accordingly, bear impressed on their features the symptoms of this rude treatment. In the fine even-

ings of summer, the old men and youths are chiefly busied in catching *sillocks*, (the fry of the coal-fish,) which swarm all round the shores, and which they allure either with limpets or an artificial fly, coarsely prepared.

Iter II. commences with a sketch of the prevailing rocks, from the most southerly shores of Dunrossness to Lunna Ness. This district includes a considerable portion of syenite, in which mica is very sparingly diffused, and which is characterized by the presence of epidote, that supplies the place of hornblende, and in some cases graduates into it; thus affording confirmation of the intimate connexion which subsists between these substances, if they are not specifically identical. At Little Holm, in Quendal Bay, this epidotic syenite is found in junction with sand-stone and conglomerate rocks. Other primitive members of the range comprised in this section are quartzose gneiss, mica-slate, and clay-slate, variously modified; with interposed layers of hornblende, a bed of iron pyrites, a thin mass of lime-stone, and a vein of micaceous iron ore, about twelve feet thick, and consequently entitled to attention, since it may possibly yield from 70 to 80 *per cent.* of metal. Mention occurs of an uncommon variety of lime-stone, "which appears to have received, from a contiguous mass of hornblende, such a slight, yet equal diffusion of its ingredients, as to have acquired the same dark bottle-green colour that distinguishes the character of the rock with which it is associated."—The rocks decidedly secondary are sand-stones of a loose texture, containing attrited fragments of other rocks and masses of conglomerate, composed of fragments of granite, quartz, and felspar. These very cursory statements, however, can convey to our readers no adequate idea of the extent and minuteness of the local details; our sole aim being to notice, in passing, some of the more prominent or unusual circumstances.

As the principles of the decomposition of rocky masses are but imperfectly understood, and the tendency to disintegration has been often observed to alter very considerably in different parts of the same mass, we may, without much violation of the rules of logic, suppose that solitary and detached blocks owe their more protracted existence to some intimate chemical affinity, or combination, which has afforded it more permanent protection against the wasting influence of ages.

We have now to advert to the history of Udal tenures in Shetland, which the author rather tediously deduces from the days of Harold Harfagre. To secure the allegiance of the islands which he had subdued, Harold is supposed to have partitioned the vanquished territory among his military and civil servants, according to their rank, or deserts; regulating the allotments by the familiar standard of the price of *wadmel*, a sort of coarse woollen cloth then in general use, and eight pieces of which, each measuring six ells, were reckoned equivalent to a mark. The *merk-stones*, or *meithes*, many of which still exist, originally indicated the boundaries of the respective shares; which varied in dimensions according to the quality of the soil, extent of surface compensating for poverty of production. Smaller subdivisions were subsequently adjusted by the *ure*, or eighth part of a mark. When the *scat*, or land-tax, was imposed on the several quotas of property, it was levied only on the grazing portions; while the arable patches, being of comparative insignificance, were exempted, and held as *udal*, or *free*. It has been computed that, at the period when Shetland was

separated from Norway, the number of marks of land amounted, as at present, to between thirteen and fourteen thousand. As the assessment was made in a sort of rude coin, called *pennings*, or *pennies*, and as no mark was rated under four or above twelve of those coins, the designation of four-penny, six-penny, eight-penny land, &c. is recognised at this day. In consequence of the introduction of Christianity early in the eleventh century, the tithes of the pope, of the bishop, and of the vicar, were levied from the udal fields: but the early state of the udal tenures was unconnected with the feodal system which so long obtained in Europe; and, in consequence of a law said to have been enacted by King Olaus, the enclosed ground, or *scatthald*, became the free property of the cultivator, and descended to his children, male and female, in equal shares. When Orkney and Shetland devolved to the Scottish crown, feus, grassums, (fines,) and various modifications of the original tenures were gradually adopted; and the iniquitous encroachments of Earls Robert and Patrick Stewart, and of the Earl of Morton, have consigned their names to all the infamy with which the present author has so repeatedly associated them. About the year 1669, nearly all the lands were feudalized, and annexed to the crown.

A few of the domestic, or rather half-domesticated animals of these islands are incidentally noticed in the course of this perambulation. The sheep are of a diminutive size, but fleet and hardy, though not a few of them are seriously injured by the inhuman practice of tearing off the fleece. The native breed of swine is also small; and the boars are but partially reclaimed, destroying the nests of birds, and making war on lambkins. The dwarfish ponies, or *shelties*, are exposed to the open air throughout the winter, when they are fenced with a coat of shaggy hair.

The most perfect specimen remaining in these isles of an ancient Scandinavian fortress is thus described:

"The Burgh of Mousa occupies a circular site of ground, somewhat more than 50 feet in diameter, being constructed of middle sized schistose stones of a tolerable uniform magnitude, well laid together, without the intervention of any cement. This very simple round edifice attains the elevation of 42 feet; it swells out, or bulges from its foundation, and draws smaller as it approaches the top, when it is again cast out from its lesser diameter; which singularity of construction is intended to obviate the possibility of scaling the walls. The door that leads to the open area contained within the structure is a small narrow passage, so low that an entrance is only to be accomplished by crawling upon the hands and knees; and in creeping through it, the wall appears of the great thickness of 15 feet, naturally leading to the suspicion of a vacuity within. On arriving at the open circular area included within this mural shell, I found the diameter of the space to be about 21 feet. On that part of the wall within the court, which is nearly opposite to the entrance, the attention is excited by a number of small apertures resembling the holes of a pigeon-house. There are three or four vertical rows of them, having each an equal proportion of openings, varying from eight to eighteen in number. It was now evident that the mural shell of the structure was hollow, and that it contained chambers, to which these holes imparted a feeble supply of light and air. Beneath the whole, at a little distance from the ground, there is a door that leads to a winding flight of stone steps, of the width of three feet, which communicates with all these apartments; I then discovered that the shell of the Burgh was composed of two concentric walls, each of about four and a half to five feet in breadth, and that a space of nearly a similar dimension was devoted to the construction of the inner apartments. In ascending these steps, which wound gradually to the top of the wall, I observed that they communicated at regular intervals with many chambers or galleries, one above another, that went round the building. These were severally of such a height, that it was possible to walk within them nearly upright. The roof

of the lowest chamber was the floor of the second, and after this manner seven tiers were raised. On reaching the highest step of the flight of stairs, there appeared no reason for supposing that any roof had ever protected the summit of the building, so that the Burgh of Mousa must have been originally nothing more than a circular mural shell, open to the top. The height of the inside wall was thirty-five feet, being seven feet less than that of the outside; this difference was partly owing to the accumulation of stones and earth, which had filled the inner court.

"The mode was now evident in which this Burgh had been intended to give security to the persons and property of the ancient inhabitants of Shetland against the sudden landing of predatory adventurers. The tiers of apartments contained within the thick walls would afford a shelter to women and children from the missile weapons of assaulters, besides being repositories for grain and other kinds of property, as well as for the stores whereby a long siege might be sustained. The low narrow door within the court, which admits of no entrance but in a creeping posture, might be easily secured at a short notice by large blocks of stone. It has been remarked of the rude forts similar to these which occur on the shores of Scandinavia, that they were seldom taken by an enemy, unless by surprise, or after a long blockade: that frequently terraces and artificial banks were raised near that side of the wall which was the lowest, and that the besieged were then annoyed with arrows, stones, boiling water, or melted pitch, being thrown into the fort;—offensive weapons which they did not neglect to return. The history of the Burgh of Mousa confirms the correctness of this observation; its high walls bulging out from their foundation, defied any attempt to scale them; for, when they were encompassed by one of the earls of Orkney, he had no hopes of inducing the fortress to surrender, but by cutting off all supplies of food, and then waiting the event of a long siege. Altogether the building was well adapted for resisting the attacks of the ancient piratical hordes of these seas, who from the short summers of northern latitudes, and from the incapability of their vessels to sustain a winter's navigation, durst not allow themselves to be detained on the coast by any tedious operations of assault."

More ruinous remnants of similar buildings occur in different parts of the islands: but, even in this instance, the chambers, owing to the decayed state of the floors, could not be explored with safety. With its history is connected the melancholy tale of Dame Margareta, the widowed mother of one of the earls of Orkney, and her paramour, Erlend.

In the vale of Tingwall, the combined effects of a bed of lime-stone, and of the exertions of an intelligent parish minister, are visible in the fertility and improved culture of the soil. Here, too, the public law-court was formerly convened in the open air, agreeably to the rude institutions of the Scandinavians; and from this circumstance the author takes occasion to present us with a sketch of the jurisdictions and internal government of Shetland, before it formed an appendage of the British dominions.

Lerwick, the principal town, is surrounded by formal enclosures of a stony and ungrateful soil, intended for gardens and the houses are placed in defiance of all ideas of regularity; yet it forms a striking and picturesque object, and exhibits even a gay and bustling appearance from the number of its shops, and the confluence of mariners and fishermen. Its resident inhabitants amount to about 1300; and they are chiefly indebted for their support to the vessels which trade at their harbour, on their way to and from the northern seas. Provisions are about one-half cheaper than in the market-towns of Scotland: various garden-esculents, particularly artichokes, are successfully cultivated; and the natives are remarkable for their hospitality to strangers.

At no great distance is situated the famous *Holm of Noss:*

"It is bounded by precipitous cliffs, and divided by a narrow channel from the equally steep rocks on which I was then standing. The traveller is now struck

with the appearance of a tremendous gulf, over which ropes are passed, from which is slung a sort of wooden trough named a cradle, large enough for the conveyance across of one man and a sheep. How such a device was first contrived, is naturally one of the first objects of inquiry. The holm, which is little more than 500 feet in length, and 170 in breadth, rises abruptly from the sea in the form of a perpendicular cliff 160 feet in height. The chasm which intervenes between it and the no less precipitous banks of Noss is sixty-five feet across. The original temptation to reach this holm was on account of the visit paid to it during the season of incubation by innumerable sea-birds, such as black and white gulls, scarfs, sea-pies, and kittywakes, when the grass became whitened with their eggs. It was therefore about two centuries ago, that an adventurous fowler was induced, by the tempting offer of a cow, to scale the cliff of the holm. This hardy and almost incredible undertaking he accomplished, bearing with him two stakes, with the intent of fixing them into that part of the bank which was nearest to the opposite rock. The object of the undertaking was now fulfilled, and the fowler was entreated to avail himself of the communication across the gulf: this he refused to do, determined to descend the way he had climbed, and in so fool-hardy an attempt he fell and perished. When the islanders first availed themselves of this ill-fated hero's success, a stone was fastened to the double of a light cord, and while one man kept in his hands the extremities of the rope, the other threw the part to which the stone was attached across to the holm. By the assistance of a long pole or fishing-rod, the cord was so elevated as to be easily drawn round the stakes; a thicker rope was then attached to the thin cord, and upon the latter being drawn in, the former was in its turn brought round the post. This operation was repeated until a firm cordage formed the medium of transport from bank to bank. In the next place, an oblong box, named a cradle, was contrived, through the extremities of which two holes were made that allowed ropes to pass along each of its sides, by which means the machine was properly slung. The first visiter of the holm then seated himself in the cradle, and since there was a slight descent towards it, he easily moved forward, and by means of the lateral cords, regulated the celerity of his conveyance. In returning, however, he was assisted by persons stationed on the opposite bank, who were employed in drawing him up by means of a rope that had been for this purpose attached to the cradle.

"At the present day, the holm is converted into a pasture for twelve sheep. The cradle is slung twice each summer, in a manner differing little from that which was practised two centuries ago. The box is made large enough for the admission into it of one man and a sheep. When Mr. Low of Orkney visited Noss, nearly fifty years ago, it was customary to fasten the double of a thin piece of packthread to a fishing-rod, and to allow a favourable breeze to blow it over the stakes; it then proved the medium by which a thicker cordage could be made to supply its place."

The third excursion comprises a large extent of country, stretching from the neighbourhood of Fitfiel Head to the northernmost extremity of Shetland, in the island of Unst. The epidotic syenite, which is supposed to be prolonged under the bed of the sea, appears again among the islands of the Bay of Scalloway; and, as it proceeds northward, it gradually diminishes in width, until it terminates on the west shore of Aith Voe, in a thin veinous mass, only a few yards in breadth. On its reappearance, it is less prone to decomposition than at Dunrossness, and it is characterized by large crystals of felspar, which are occasionally an inch or an inch and a half in length; while, in the island of Burna, it contains much hornblende. At several places it may be observed graduating into gneiss, and distributing the strata at the points of junction; and, at Bigseter Voe, it comes in contact with thin strata of limestone. In the parish of Sandsting, a granite mass extends about ten miles in length, and four in breadth, remarkable for its great deficiency in mica, and for its excess of very red felspar. As hornblende and epidote likewise enter into portions of its composition, it may be termed, indifferently, either granite or syenite.

Modifications of similar rocks are traceable at Olnasfirth Voe, Baldister Ness, &c.

Large tracks of gneiss are next described, with a degree of minuteness which we should in vain attempt to follow. On some occasions, they include hornblende and grenatite, or interstratified primitive limestone: or they are traversed by granitic veins, or verge or genuine granite. In the gneiss of Lelaness, is found a singular vein of felspar, six feet in width, and consisting of spheroidal concretions, which measure not less than six or eight inches over. On the shore of Kirkaness, Dr. Hibbert encountered beautiful specimens of that rare mineral termed *rose-quartz:* but he mistakes when he asserts that its recorded localities are restricted to particular spots in Bavaria, Bohemia, the Hartzberg Forest, and America; for it has been found at Arendal, in Norway, in Finland, abundantly in the Kolyvan mountains, and at Tigerateky, in the Altaic chain, at Bigloe, in the neighbourhood of Glen Tilt, in Scotland, and in the island of Coll, one of the Hebrides. In France, it is confidently stated to have been discovered at Chateauneuf, in Auvergne; and, in blocks of considerable dimensions, in the granitic plain which separates Marmejols and Saint Chely, in the department of the Lozère; particularly near Plane and Chabanols, in the same department.

In the serpentine of Unst, which forms a very interesting tract to the mineralogist, Dr. Hibbert first ascertained the presence of hydrate of magnesia, which had formerly passed for white talc, but the true nature of which was distinctly established by Dr. Brewster, in a valuable paper inserted in the Philosophical Transactions of the Royal Society of Edinburgh, for 1821. Another important mineralogical discovery is that of considerable quantities of chromate of iron, imbedded in or detached from the serpentine. Allied to the latter are some strata of talcose and micaceous slate, which graduate into one another, and are so strongly impregnated with magnetic iron as to affect the compass in a remarkable degree. We have also to notice the *euphotide* or *diallage-rock*, of which the basis is a hard, compact, white felspar; and the diallage, Labrador spar, or hyperstene, appears to be hornblende, modified by magnesian earth.

We transcribe the ensuing paragraph, because it records an extraordinary fact, and because it may help to explain, by the agency of the electrical fluid, one or two very problematical transpositions of large blocks of stone, related on testimony which we cannot conscientiously impugn:

"At a small distance from Funzie, a remarkable instance of the effect of thunder took place about the middle of the last century. A rock 105 feet long, ten feet broad and in some places more than four feet thick, was in an instant torn from its bed, and broken into three large and several lesser fragments. One of these, twenty-six feet long, ten feet broad, and four feet thick, was simply turned over. The second, which was twenty-eight feet long, seventeen broad, and five feet in thickness, was hurled across a high point of a rock to the distance of fifty yards. Another broken mass, about forty feet long, was thrown still farther, but in the same direction, quite into the sea. There were also many lesser fragments scattered up and down."

Dr. H. adverts to specimens of pumice, which are occasionally found on the shores of Shetland, and, we believe, even on those of Caithness; wafted, possibly, by the currents of the sea from Iceland. At the same

time, symptoms of a submarine eruption, in the vicinity of Fetlar, were perceived in the year 1768, when the water in the bays was black and muddy for eight days together, and quantities of dead fish were cast on the shore.

Before he quitted the island of Fetlar, the Doctor visited a lad who was born deaf and blind, and whose deplorable case, as detailed by a gentleman of the faculty, will be found not undeserving of attention. Instead, however, of quoting the passage, which occupies several pages, we shall introduce our readers to a Sunday-scene in Unst:

"A walk through the valley near Woodwick leads to a large open lawn at the head of the Loch of Cliff, which seemed very populous and well cultivated. I arrived there on the Sabbath morning: the natives of the vale were all in motion in their way to the Kirk of Baliasta. The peasant had returned home from the bleak scathold, where he had ensnared the unshod pony that was destined to convey him to the parish kirk. No currycomb was applied to the animal's mane, which, left to nature's care, 'ruffled at speed, and danced in every wind.' The nag was graced with a modern saddle and bridle, while on his neck was hung a hair-cord, several yards in length, well bundled up; from the extremity of which dangled a wooden short pointed stake. The Shetlander then mounted his tiny courser, his suspended heels scarcely spurning the ground. But among the goodly company journeying to the kirk, females and boys graced the back of the shelty with much more effect than long-legged adults of the male sex, whose toes were often obliged to be suddenly raised, for the purpose of escaping the contact of an accidental boulder that was strewed in the way. A bevy of fair ladies next made their appearance, seated in like manner on the dwarfish steeds of the country, who swept over the plain with admirable fleetness, and 'witch'd the world with noble horsemanship.' The parishioners at length arrived near the kirk, when each rider in succession, whether of high or low degree, looked out for as green a site of ground as could be selected, and, after dismounting, carefully unravelled the tether, which had been tied to the neck of the animal. The stake at the end of the cord was then fixed into the ground, and the steed appeared to be as satisfactorily provided for during divine service, as in any less aboriginal district of Britain, where it would be necessary to ride up to an inn, and to commit the care of the horse to some saucy lordling of the stables.

"The kirk was remarkably crowded, since there was a sermon to be preached incidental to the administration of the sacrament; on which occasion I had an opportunity of seeing the convulsion fits to which the religious congregations of Shetland are subject. The introduction of this malady into the country, is referred to a date of nearly a century ago, and is attributed to a woman who had been subject to regular paroxysms of epilepsy, one of which occurred during divine service. Among adult females, and children of the male sex, at the tender age of six, fits then became sympathetic. The patient complained, for a considerable time, of a palpitation of the heart; fainting ensued, and a motionless state lasted for more than an hour. But, in the course of time, this malady is said to have undergone a modification such as it exhibits at the present day. The female, whom it had attacked, would suddenly fall down, toss her arms about, writhe her body into various shapes, move her head suddenly from side to side, and, with eyes fixed and staring, send forth the most dismal cries.

"An intelligent and pious minister of Shetland informed me, that being considerably annoyed on his first introduction into the country by these paroxysms, whereby the devotions of the church were much impeded, he obviated their repetition, by assuring his parishioners, that no treatment was more effectual than immersion in cold water, and as his kirk was fortunately contiguous to a fresh-water lake, he gave notice that attendants should be at hand, during divine service, to ensure the proper means of cure. The sequel need scarcely be told. The fear of being carried out of the church, and into the water, acted like a charm; not a single Naiad was made, and the worthy minister has, for many years, had reason to boast of one of the best regulated congregations in Shetland.

"When I attended the kirk of Baliasta, a female shriek, the indication of a convulsion-fit, was heard; the minister (Mr. Ingram of Fetlar) very properly stopped his discourse, until the disturber was removed; and after advising all those who

thought they might be similarly affected to leave the church, he gave out in the mean time a psalm. The congregation was thus preserved from farther interruption; for, on leaving the kirk, I saw several females writhing and tossing about their arms on the green grass, who durst not, for fear of a censure from the pulpit, exhibit themselves after this manner within the sacred walls of the kirk."

A long description ensues of circular ranges of stones at Crucifield, which some of the learned have supposed to be druidical, and others have regarded as a Scandinavian temple: but there is reason to believe that they were intended for popular judicial assemblies. The *skoes*, or more homely square buildings, of which some still exist, were destined for preserving butcher's meat and fish, which formerly was hung up, and allowed to dry in the air, without salt. The fish, however, was not cured without acquiring a certain degree of taint, not unpalatable to the Shetlander. Want of room compels us to omit mention of the chase, capture, and slaughter of a drove of the *Delphinus deductor*, and of various rude and slovenly proceedings in the department of rural economy. The management of the sheep is in various respects objectionable; yet the fleece, which is remarkably soft, has been wrought into stockings so fine as to sell at 40 shillings a pair, although the coarsest are not worth more than sixpence.

A visit to *Trolhowland*, or the *Hill of Trows*, or *Demons*, introduces some interesting remarks on the superstitions of the Shetlanders; particularly on their belief in a race of dwarfs, or subterraneous beings, remarkable for their riches, their activity, and their malevolence, and whose history may be traced in the Gothic mythology of the north, while the popular creed still retains a strong impress of the grossness and absurdity which characterized the ages of heathen darkness. The practical morality of the lower orders does not afford very convincing evidence of permanent amelioration; for they are extortionate in their charges for boat-fare, which, with *wrecks*, and a drove of whales, they regard as *God-sends*.

The fourth and concluding journey embraces a western district of Shetland, included in the parishes of Aithsting, Walls, Sandness, and Northmavine. The central or fundamental rock is granite, like that which has been previously described, but containing hardly any mica, and very little hornblende. Syenitic greenstone forms a mass, twelve miles in length, and from one to three in breadth, and, at its junctions with the granite, penetrates and is penetrated by that rock.

"But one of the most curious appearances is presented in the granite to the north of Roeness Hill, by the invasion or inclusion of a dike of sienitic greenstone, which, in some places, is two or three hundred yards in breadth. The line of its course may be easily seen in taking a direction of north-west from a point of land on the north-west of Colafirth Voe, between the foot of Colafirth Hill, and the commencement of the Biergs: the disorder that has taken place by the invasion is evinced in the irregular surface of the hill for a distance of five miles. Small eminences, of various and confused shapes, start abruptly from the surface of the plain, while their recesses are filled with a continued chain of hollows, that form the beds of several lakes. On the west of the granitic mass, the dike has nearly reached its termination, since it is exposed along the precipices of the coast in the form of much smaller veins, branching out in numerous directions, and presenting every variety of form."

A remarkable separation has taken place between the granite and the greenstone at Hillswickness: so that strata, occupying an area of a mile and a half in length, and three quarters of a mile in breadth, are

completely environed by two unstratified granitic rocks. The claystone, quartz-rock, &c. of the same range, need not to detain us: but the Doctor properly remarks that the appellation of the former is apt to induce an erroneous idea of its composition, and that it is more properly a secondary felspar.

In the course of this part of the work, an account is inserted of the Dutch herring-fishery, as it was prosecuted on the coast of Shetland; and of that of ling, as it is at present conducted by the islanders themselves: from which some valuable hints may be derived relative to an important branch of our national economy. In the mean time, the author places in a strong point of view the impolicy and abuse of the Shetland fisheries, arising out of the complicated tenures of the country, and other causes which are more easily perceived than removed. He likewise adverts to the recent discovery of a cod-bank, called the Regent's Fishing Bank, which promises to yield a profitable return to the prudent and skilful adventurer.

The prevailing diseases in these islands are reckoned, *phthisis pulmonalis, pneumonia,* croup, scrofula, dyspepsy, and liver-complaints. Cutaneous affections, especially *tinea capitis,* are also frequent: but various instances are on record of protracted old age. Scurvy-grass is much in vogue for disorders of the skin, butter-milk for dropsy, calcined and pounded whelk-shells for dyspepsy, and a variety of steatite for excoriations. The *doctors* let blood by cupping, with the upper part of a ram's horn perforated at the top.

For a lively and entertaining account of the sword-dance, of other rude and popular festivities, and of the superstitions of the Shetlanders, among which witchcraft holds a distinguished place, we must now beg leave to refer to the work itself. Before, however, we dismiss the latter from our table, it behoves us to mention that it includes much varied and authentic information, the obvious result of personal observation and discriminate reading; and that the plates, though executed on a small scale, and not adorned with any luxury of engraving, are sufficiently distinct for ordinary illustration.

FROM THE MONTHLY REVIEW.

Journal Militaire de Henri IV., &c.; *i. e.* The Military Journal of Henry IV., after his Departure from Navarre, from the Original MSS. Introduced by an Essay on the Military Art of that Period. With Plates and a Fac-simile. By the Count DE VALORI. 8vo. pp. 412. Paris. 1821. London, Treuttel and Co. 9s.

WELL may the name of *Henri Quatre* be dear to every Frenchman in whom one spark of national glory burns, since he presents the most sagacious and tolerant, the most heroic and amiable prince that adorns the page of modern history. As his illustrious cotemporary monarch, Elizabeth of England, sacrificed or subdued her own predilections in favour of the Catholic religion to the Protestant feelings of her subjects, so did Henry—the Protestant King of Navarre—when he had ascended the throne of France, and acquired the greatest military reputation by his successes against the Catholic League; after having defeated his enemies in a pitched battle under the walls of Yvrée, and

increased his advantages over them in successive campaigns;—so did Henry renounce his own religious creed, and embrace the Catholic tenets, which were generally and pertinaciously cherished among his subjects. Every thing was in his mind subordinate to the public good; and, whatever theologians or moralists may think concerning the sincerity of Henry's conversion, the politician, at least, will acknowledge its effects in healing the wounds of civil war and assuaging the animosities of his kingdom.

The work before us, as the title-page expresses, is merely a journal of the campaigns of Henry; and the preliminary discourse on the state of the military art in his time is a dry narrative of the changes of discipline introduced into the army by him; of the state of the cavalry, infantry, and artillery, and the style of fortification; of the varieties of weapons used by the regular and the irregular corps; and of the various modes of attack, defence, advance, and retreat.

Henry had studied the military tactics of the ancients in the Commentaries of Cæsar, and in Plutarch's Lives; and he revived, says the Comte DE VALORI, the Carthaginian practice of introducing and preparing for a general action by skirmishes and affairs of outposts, in which he fatigued and harassed the enemy, pushed him back, or decoyed him to advance, till he had drawn him into the position most advantageous to his own purpose. His custom was to absent himself at a short distance from those petty actions, till the day intended for the great conflict: when, being informed by his couriers of the bursting storm, he entered the field of battle with the flower of his nobility and his most devoted adherents, and, infusing into them by his presence additional courage, he gave new vigour to their arms. On the eve of battle, also, when thus concealed from the spot, he would spread a report in order to deceive the enemy, that he was engaged in some insignificant affair, several leagues off; and then on a sudden, to use the Count's poetic imagery, he would make his appearance "like the god of war just sprung from the arms of Venus," terrible in onset, and with a presence of mind that often disconcerted his astonished enemy. Surely, however, this playing at bo-peep must have been a very hazardous game, and rarely to be adopted. Dim-sighted must the scouts be who could twice be deceived by such petty manœuvres; and if the Duke of *Mayenne*, governor of the League, could be thus tricked, the consummate skill and vigilance of the Duke of *Parma*, the greatest general of his time, was not so easily lulled asleep.—Yet the poetic language of the Comte DE VALORI is reducible to very sober and faithful prose; for it *was* from the arms of a Venus that this god of war did often rise, and plunge into the field of battle; and in her arms too did he rest, and sometimes slumber, after the perils of an engagement. The beautiful Corizande, *Diane d'Audouins*, had already twined her silken threads round the heart of the hero while yet only King of Navarre; and after the battle of Coutras, where he defeated the army of Henry III., under the two *Joyeuses*, instead of marching straight to Paris, he lost the fruits of his victory by leaving his army in order to enjoy the raptures of her society. These secret visits to his mistress, however, had sometimes their advantages. The Duke *de Mayenne*, while in Gascony, having been informed that the enamoured king was in the frequent practice of stealing to the retreat of his Diana, thought that it would not be difficult to surprise the royal

lover, and accordingly distributed parties of cavalry to occupy all those places through which he conceived the prince must pass:—but, whether Henry received information of the project, or the snares were unskilfully laid, the result was that *Mayenne* lost more than two months in this fruitless attempt, and enabled several towns, which had not before thought of their defence, to gain time and opportunity for effecting it. If this was a double *ruse* of the warlike and amorous monarch, a *ruse de guerre* and a *ruse d'amour*, it must be acknowledged that Mars and Venus could not have entrusted the management of their affairs to more willing hands, or hands more consummately dexterous in the execution of them. It was said that Henry became so much attached to *Diane d'Audouins*, as to have promised her marriage: but that he recalled his pledge at the pressing entreaty of *D'Aubigné*;—as the Duke *de Sully* twice interfered on similar occasions with respect to the Duchess of *Beaufort* and the Marchioness of *Verneuil*.

Henry IV., however, says M. DE VALORI, knew how to sacrifice his inclinations to the happiness of France, as he exposed his person a hundred times for the safety of the state. *Diane d'Audouins, Gabrielle d'Estrées*, and *Henriette d'Entraigues*, successively seduced his noble heart, which was so much inclined to gallantry: but their impassioned sighs could not stifle the voice of a more imperious mistress —France herself. Of all the objects of his affection, the beautiful Diana contributed most to the advancement of the king's affairs; she supplied him with succours of men and money, and was made the confidante of his military measures. At the end of the "Journal" is a collection of letters from Henry, the first series of which is addressed to this favourite mistress, and relates the military operations which he was pursuing from the year 1588 to the death of Henry III. They are brief, sprightly, full of love and war; generally written at night, informing her of the events of the day and the projects for the morrow; and blowing a thousand kisses, with assurances of untainted and unalterable fidelity!—The second series is composed of letters to private friends: they are very easy, unaffected, and familiar even to playfulness. Several scraps also occur, addressed to Monsieur *Harambure*, who was blind in one eye, having lost it at the taking of Niort. Henry generally begins his letters to him, "*Borgne*," and at the close of one announcing his expectation of an engagement, he says, "Mind your eye; you will be quite blind if you do not." At another time, he exclaims, "*Harambure*, go and hang yourself, because you were not by my side in an engagement which we have just had with the enemy, &c..... I will give you all the particulars when we meet, and come as soon as possible, for I am anxious to see you.—Adieu, *Borgne*." * To Monsieur *La Gode*, he says, "They tell me that you do not love me, *La Gode*, and Le Sieur *Emery*, the bearer of

* Precisely in the same terms, as our historical readers will recollect, Henry wrote to *Louis de Crillon*, on the capitulation of Amiens:

"Brave Crillon, pendez vous de n'avoir point été ici près moi Lundi dernier, à la plus belle occasion que se sois jamais vue, et qui peut-être se verra jamais. L'ennemi nous vint fort furieusement, mais il s'en est retourné fort honteusement. J'espère Lundi prochain être dans Amiens, où je ne séjournerai guères, pour entreprendre quelque chose. Adieu. Au camp d'Amiens, le 20 Septembre, 1597. HENRI."

this, confirms me in the story; if that is the case, I disown you, and will cut your throat the first time I see you. Adieu, *La Gode, ma mie.*"

We find also a very beautiful and touching letter *from* the Marquise *de Verneuil* to Henry on his marriage, dated January, 1601, which we should translate if its length did not forbid. The sighs of the Marchioness, however, were not inaudible to the royal ear; and several letters, breathing the warmest vows, were many years afterwards transmitted to her by the too susceptible monarch.—In this second series, are a number of letters written in a style which do great credit to the parental feelings of Henry, addressed to Madame *de Montglat*, who was the governess of his children. In one of these he says, "I am half angry that you did not let me know you had whipped my son; for I wish and command you to whip him as often as he is obstinate, or does any thing that is wrong; well aware from experience that nothing in the world will do him half so much good, for I know that it was of the greatest use to me. When I was his age, I was often flogged, and smartly too; and for that reason I request you to do the same by him, and make him understand that it is my wish." Henry, who was fond of his children, and never suffered them to call him by any other designation than "*mon père*," or "*papa*," was sensible of his obligation to Madame *de Montglat* for her assiduous care and instruction; and in this collection is a letter addressed to her on the death of her husband, in which the monarch observes; "I sincerely participate in your affliction for his loss: but we must bow with submission to the will of Providence. Console yourself with the assurance that if God has withdrawn from you one good husband, he has also given you another, and moreover has left you a good king and a good master. My son will in future be your husband, and I your good king and good master," &c. &c.

It remains to say a few words as to the genuineness of these memoirs. The manuscript letters and journal are stated to be in the *Bibliothèque du Roi*, and it is singular that such materials should have been overlooked by the inquisitive eye of historians: but these historians, it must be presumed, did not believe that the MS. was the actual journal of Henry IV., although it is so called in the oldest catalogue. It has, however, all the internal evidence which great minuteness of detail can give, not only as to the incidents of the battles described, but as to the preliminary manœuvres of the army and the particular movements of different officers. There is indeed a *vraisemblance* about the journal; a fulness of anecdote which makes it evident that it was written on the spot. The Comte DE VALORI tells us that, after much research, he has been able to fix on the person to whom was entrusted the task of compression; viz. a "*sergent de batailles*," named *Guy d'Hermay*, afterward secretary to Henry IV.: to which individual the king, in his leisure moments, is supposed to have dictated the recital of those petty preliminary actions which so generally led to the most important victories.

FROM THE ECLECTIC REVIEW.

Campagne des Autrichiens contre Murat, &c.; i. e. The Campaign of the Austrians against *Murat* in 1815. By V** C** DE BR., an Eye-witness. 8vo. 2 vols. Brussels. 1821.

THIS is not an uninteresting book, though one half of it is made up of shreds and patches, odds and ends, which have no more to do with the campaign of the Austrians than with the retreat of the 10,000, or the march of Hannibal across the Alps. An exact description of the physical features of a country which is the scene of military operations, its hills and passes, rivers, fastnesses, and ravines, doubtless facilitates an understanding of the movements of the armies engaged; but it is curious that such descriptions are here given subsequently to the narrative of the campaign itself; the latter being detailed in the first volume, and the former being allotted to the second. Not satisfied with these particulars, the author, inspired by the classic air of Italy, carries us into the catacombs of Naples, the grotto of Pausillippo, the tomb of Virgil, and the temples of Augustus, Serapis, Diana, Neptune, and Apollo: he even ventures fearlessly across the Acheron, and safely lands us in the Elysian fields.—Besides a description of the theatre of war, we are indulged with an account of Herculaneum and Pompeii; and, as an appropriate appendix to the irruption of the Austrians into Italy, and the fall of *Murat*, we have a description of Vesuvius pouring over the desolated plains her fiery lava. Even the modern palaces, museums, theatres, churches, galleries, &c. are not omitted: in short, the author has taken great pains to please the taste of *some* among the multitude of readers; and it would be hard indeed to have altogether failed in so laudable an effort.

Joachim Murat, first Grand Duke of Berg and afterward King of Naples, was born at La Bastide Fortunière, March 25, 1768. His family, who were cultivators of the soil, lived in easy circumstances; and he was destined from his infancy to the church, in order that he might succeed one of his uncles, who enjoyed a benefice. The impetuosity of his character, however, soon displayed itself: he spurned the restraints of scholastic discipline, joined the gayest of his comrades in every party of pleasure, and testified an invincible opposition to the views of his friends. Having left the College of Cahors, he was sent to graduate at the University of Toulouse: but, feeling himself more free than ever from restraint, he yielded to the effervescence of his passions; and, when he found his money exhausted, he enlisted as a soldier with a quarter-master, named *La Rocheblin*, of the regiment of Ardennes. His family, grieved at the circumstance, released him from the engagement: but he did not enjoy his liberty; and the military ardour rekindling within him, he soon returned to *La Rocheblin*, engaged himself a second time, and joined the regiment. In the year 1791, *Murat* and *Bessières*, afterward Duke of Istria, were elected into the *Garde du Roi*, which was dissolved on the 30th of May in the year following. He immediately obtained a sub-lieutenancy in a regiment of chasseurs; and on various occasions he displayed such bravery and talent, that, when *Bonaparte* assumed the command of the army of Italy in 1796, he took *Murat* with him as *chef-de-brigade* and his first *aide-de-camp*. The campaigns of this and

the following year developed those military talents for which he afterward became so remarkably distinguished. Pursuing the enemy at the battle of Roverido, he crossed the Adige with a detachment of chasseurs, each man taking a foot-soldier behind him; at the battles of Bassano, Rivoli, and at the passage of the Tagliamento, he successively increased his reputation as a warrior; and, having been sent on various diplomatic missions to the courts of Genoa and Turin, he executed these also—backed by a conquering army—with great energy and success. He had now acquired the entire confidence of *Bonaparte*, whom he accompanied in his expedition to Egypt in 1798. The French became masters of Alexandria on the 2d of July, and defeated the Mamelukes at the battle of the Pyramids, which opened to them the gates of Cairo. Greedy of plunder, the soldiers furiously, and without control, precipitated themselves wherever it was to be obtained. *Murat* had just entered the house of a rich Mameluke, when a party of soldiers burst into the harem and scattered terror among the females: but they all made their escape, except one unfortunate victim, who was on the point of being sacrificed by these savages. At the sight of a lovely female, only sixteen years of age, throwing herself at his feet, in terror and in tears imploring his protection, the heart of the general melted within him, and he ordered the soldiers to retire: but they despised his commands; their passions were on fire, and riot was let loose; he used force; they resisted; and one of them, with uplifted arm, threatened to murder his general if he persisted. *Murat* struck the soldier with his sabre, and prepared to attack the others: who were intimidated, fled, and left the lovely Egyptian fainting in the arms of her deliverer. Desperately smitten, *Murat* did not separate from her till the expedition into Syria: at that time she remained at Cairo: but, during his absence, a captain of artillery saw her, became enamoured of the widowed beauty,—and carried her away. "*L'amour fait passer le temps,*" says the French proverb, "*mais le temps, aussi, fait passer l'amour!*"

When *Bonaparte* left his army in Egypt, *Murat* came with him to Paris, and contributed not a little by his presence of mind to the success of the revolution of the 10th November, 1799; when, for the moment, being startled at the danger of his own situation, *Bonaparte* was rallied and restored to confidence by the courage of his friend, who entered the Hall of Deputies at the head of sixty armed grenadiers, and with a firm voice exclaimed, "Let all good citizens retire: the Council of Five Hundred is dissolved!" The First Consul rewarded the fidelity of his brother-warrior by bestowing on him in marriage his youngest sister, *Marie-Annonciade-Caroline-Bonaparte*, and creating him Commander of the Consular Guard. In May, 1800, hostilities recommenced in Italy between France and Austria. The capture of Milan by *Murat*, and the passage of the Po, were preliminary to the decisive battle of Marengo, where that general commanded the French cavalry, and, aided by the bravery and skill of *Dessaix*, essentially contributed to snatch the victory from the Austrians; who had considered themselves as conquerors till the evening of the day, and who lost the battle by their confidence of winning it. *Murat* was intrusted with the provisional government of the Cisalpine Republic in 1801. He returned to France in 1803, was named President of the Electoral College of the department of Lot, where he was born, be-

came a member of the Legislative Body, and was appointed Governor of Paris in 1804, with the full rank and honours of General in Chief and Marshal of France.

Soon after the victory at Austerlitz, where his skill and intrepidity were again eminently conspicuous, the *Emperor Bonaparte* conferred on this officer, whom he had before raised to the rank of *Prince*, the entire property of the duchy of Clèves and Berg; and he took possession of his territory with the title of Grand Duke, which was immediately recognised by all the powers of the continent! The battles of Eylau and Friedland were followed by the treaty of Tilsit: but *Napoleon* had cast his eager eye on Spain; and *Murat*, being appointed Commander in Chief of the Army of Invasion, entered Madrid at the head of his troops, March 23, 1808. The insurrection of the 2d and 3d of May was punished by a dreadful slaughter: thirty rounds of cannon among a crowd of 20,000 people, together with repeated charges of cavalry, sword in hand, soon cleared the streets of living insurgents, and choked them up with dead! *Murat* enjoyed the plenitude of royal authority at Madrid as Lieutenant of Charles IV.; and, on the advancement of *Joseph Bonaparte* to the throne of Spain, he was elevated by the gratitude of his imperial master to that of Naples, where he arrived in September, 1808, and was received with the customary demonstrations of loyalty and devotion.

Here we shall leave him, for a time, apparently in secure if not quiet possession of his throne. So secure, indeed, he felt, as not only to furnish *Bonaparte* with a contingent of 12,000 men and a part of his guard, on the emperor's march to Moscow, but as to determine also on accompanying him in that disastrous expedition. As at Waterloo, so was it at Moscow,—"*Sauve qui peut:*" *Bonaparte* abandoned his army in both these emergencies, and fled to Paris. *Murat*, foreseeing the changes which must take place in Europe from the utter failure of the Russian war, prudently returned to his own dominions, that he might be on the spot if it were necessary to open negotiations with England and Austria. Perhaps *Napoleon* suspected that the fidelity of his royal brother-in-law was not impregnable, from some unguarded expressions or movements of the latter; certain it is that he gave the command of the army to *Eugene Beauharnois*, and no longer concealed from *Murat* the disgrace into which he had fallen. This rupture excited in other cabinets the hope of detaching *Murat* altogether from the French alliance: but, when *Bonaparte* reappeared at the head of another army on the plains of Saxony, *Joachim* could not remain a passive spectator, and, forgetting all his injuries, rendered new services to his imperial friend in this bloody campaign. The battle of Leipzic in October, 1813, having again changed the face of affairs, he returned to Italy almost alone, bought a miserable voiture at Milan, and with this humble equipage proceeded to Naples.

Anticipating the fall of *Bonaparte*, who had grievously offended him; and who, he well knew, had taken a resolution to dethrone him whenever such a measure might be deemed essential to his own interest or security; *Murat* entered into a treaty of alliance offensive and defensive with the court of Vienna, which was effected on the 11th of January, 1814, by the Comte *de Neipperg*, who had been sent to Naples for that purpose. England acceded to this treaty, by which not merely the integrity of his states was guaranteed to the King of Na-

ples, but an addition of territory in the march of Ancona and in Romagna; he engaging, on his part, to furnish the allies with 30,000 troops. The British minister did not yield his *written* concurrence to this treaty, but Lord William Bentinck gave in a note, stating that, if the Neapolitan government would rely on the word of a British minister, he assured them that he was authorized to accede to the treaty on the part of his government. At the conferences of Chatillon, too, when some arrangements were proposed by *Talleyrand* on the part of France, in relation to Italy, it was distinctly stated by all the four ministers of the allies, "that Italy then formed no part of the question; the coalition having already resolved to re-establish the ancient governments of Italy, *except at Naples*, where the title of King *Joachim* had been recognised, by virtue of a treaty which Austria had concluded, and to which England had acceded." To "make assurance doubly sure," Lord W. Bentinck soon afterward communicated to *Murat* an official despatch from Lord Castlereagh, stating most explicitly "that it was only from motives of delicacy towards the King of Sicily, that the English government was induced to delay for a moment the conclusion of a special and particular treaty of alliance with the King of Naples; the British government being desirous that a treaty of indemnity to the King of Sicily should go hand in hand with the treaty of alliance with King *Joachim*."

It is not to be imagined for a moment, we presume, that *Murat* was really very anxious for the success of the allies: he did not wish to see his native country conquered by foreign arms, nor did he desire to dethrone his brother-in-law: but he was anxious to secure the stability of his own throne, and for that purpose it was necessary to extricate Italy from the influence of France, and to be on good terms with the coalition. His avowed object in joining the allies was to confine *Bonaparte* within the boundaries of his own country: but he does not appear to have entered into those ulterior views which they entertained, of invading France, and deposing the emperor; and this may be one reason, perhaps, for the perfidy which was afterwards exercised towards him: for the British government subsidized the King of Sicily, while that court was occupied in measures for expelling *Murat* from Naples, and while England itself was a guarantee for the integrity of his dominions. This, we believe, has never been denied.

Murat, resting on the word of honour which he had received from an accredited English minister, set his army in motion without waiting for the ratification of his treaty with Austria, advanced to Bologna, and engaged a detachment of the French under the walls of Reggio. The services which he rendered to the allies by his movements in the north of Italy were fully appreciated by the Austrian commanders, and the whole of his conduct was conformable to his first demonstrations: the result is well known: the French were defeated, *Bonaparte* was sent to Elba, and peace was concluded. *Murat*, however, was environed with difficulties. Generosity, frankness, and confidence the most indiscreet, were natural traits in his character, and, united with indifference to personal danger, formed his *virtues*: not untarnished by those military vices which more particularly may be expected to accompany the career of a coarse, uneducated, uncontrolled, mere military adventurer; viz. impatience of opposition, rest-

lessness, and prodigality of human life. He could not at first give way to his doubts: but he received a letter from Vienna informing him that the French plenipotentiary, *Talleyrand*, was using, and with every appearance of success, his utmost exertions at the Congress to dethrone him: even his own ministers there, the Duc *de Campo Chiaro*, Prince *Cariate*, and General *Ambrosio*, and his minister at the Court of St. James, reiterated to him their cautions to hold himself on the defensive, and not to pass his own frontiers, but to preserve a firm, resolute, and even menacing attitude. These things at last roused the languid suspicions of *Murat*, who appears to have now renewed his intercourse with *Bonaparte* at Elba, and to have been made acquainted with the measures successfully adopted for his escape. A remarkable conversation is reported to have taken place between *Murat* and a M. *de J****, from whom the author of the work before us says he personally received the particulars. We must abbreviate the dialogue.

March 2, 1815, at five in the morning, a footman came to M. *de J****, who possessed the entire confidence of *Murat*, and requested him to attend on the king without a moment's loss of time. On reaching the palace, he found *Joachim* already dressed, and prepared to mount his horse. With a smile on his countenance, he said to him, "You will not doubt my intelligence, however it may surprise you;—the emperor is in France, or will be very soon: he left the Isle of Elba on the 26th or 27th of February, and I am in momentary expectation of the news of his arrival. I have just received this information by the private secretary of the Princess *Paulina*, whom she despatched to the queen, and who arrived only two hours ago. What would you do in my situation?"—"I would instantly despatch messengers to the cabinets of London and Vienna," replied M. *de J****, "to assure them that I should remain faithful to my engagements with them, uninfluenced by that event."—"What you advise me to do," said the king, "I have already done; I despatched couriers to these courts an hour ago: but, in holding to my treaties with Austria, I have a right to expect great compensations. Whatever be the issue of affairs in France, you must immediately depart for Italy; and prolong your stay in those cities where you judge your presence to be most necessary. I was thinking of appointing you Counsellor of State before your departure: but, on reflection, it seems to me that such a nomination would not suit you: for, in travelling over Italy, wherever you go you will meet Austrians, and the title will be more burdensome than useful. On your return I shall be most happy to acknowledge your services. Depart, then, as early as possible: but as soon as you learn that the emperor has reached Paris, go thither, and watch over my interests. I will immediately acquaint Austria with my projects: *if she does not oppose my views respecting Italy, I remain her ally; if she does thwart them, I shall be at the head of an army in a week, and open the campaign.*"

Murat's suspicions of Austria are here very clearly expressed: but whether they were well founded or not is another question, in the discussion of which we are not now called to engage. The news of *Bonaparte's* landing at Cannes, and of his unobstructed progress to Paris, spread over Europe with the rapidity of daybreak; and it was necessary that *Murat* should immediately decide to join the coalition, to

remain neuter, or to march against Austria. M. *de J**** proceeded to Rome, where he had frequent interviews with *Lucien Bonaparte;* and the advices which they had both received as to the force and movement of the Austrian troops were communicated to *Murat* by a courier extraordinary, assuring him that he would be attacked on his own territory if he did not immediately conclude a treaty of alliance, or did not himself commence hostilities. While he was hesitating which course to pursue, he received a letter from *Joseph Bonaparte* at Paris, which announced the continued success of the emperor; spoke of the amicable disposition of Austria towards France, and the expected return of Maria Louisa and her son; and urged him to join his forces to those of *Napoleon*, as the only security for his political existence and his throne. This letter fixed the wavering resolution of *Murat*. He began his measures by demanding of the Count of *Bellegarde*, governor-general of the kingdom of Italy, a passage for 80,000 troops, to march, as he said, against the usurper of the throne of the Bourbons: expecting thus to rouse the spirit of revolt against Austria which had already begun to display itself in different parts of Italy, to get possession of Piedmont, and open a communication with Marshal *Suchet*, who commanded the army of the Alps. This preposterous demand was, of course, rejected.

King *Joachim* left Naples on the 12th March, 1815, and arrived at his head-quarters at Ancona on the 15th. By most extraordinary efforts, he had collected an army of 70,000 men, well equipped, and in good condition. It was composed of six divisions; three of which were commanded by the king himself, comprehending 33,250 infantry and 2,400 horse; and the other three were led by Generals *Livron, Pignatelli*, and *Pignatelli-Cerchiara*, comprehending 30,750 infantry, 1,100 horse, and a reserve of 2,500 men. Without any formal declaration of war, *Murat* marched with his three divisions on Catholica, where he found the first Austrian posts: the other divisions penetrated into Tuscany. General *Steffanini*, who commanded the Austrian forces *in the Marches*, was of inferior strength, and acted on the defensive: indeed, the troops which Austria had in Italy at this time were insufficient to cover Piedmont against France, to occupy the numerous fortresses and large towns of Italy, and at the same time successfully to oppose the Neapolitans. As reinforcements were coming up, Baron *Frimont*, who commanded the Austrian cavalry, judiciously confined himself to the protection of the citadel of Ferrara, and the *têtes-de-pont* on the Po, the Occhiobello, and the Borgo-forte. After some slight skirmishing of outposts, the Neapolitans took possession of Bologna, and advanced to the Panaro, which was defended by the Austrian Lieutenant-general *Bianchi*. The passage was obstinately disputed, but the Neapolitans had 16,000 men engaged, and they succeeded: this was on the 4th of April, and was the commencement of actual hostilities. A few days afterward, they were checked at Pistoja, and at Carpi, which was taken by the Austrians, April 11th, as Ferrara likewise was on the 13th. The concentration of the Austrian forces which had been brought up was also effected before Bologna, on the 16th and 17th of April; from which time till the 3d of May no operations of much importance took place, otherwise than as they led to the decisive battle of Tolentino, in which the Neapolitan army was utterly routed and dispersed, near to Macerata,

which fell into the hands of the Austrians. General *Bianchi* followed up the victory by a pursuit of the flying foe within his own territories.

Tolentino is situated on the left bank of the Chienti, and at no great distance from the coast of the Adriatic. On the *evening* of the 4th, the Neapolitans still had possession of San Guisto and Civita Nuova; and it was of the utmost consequence that they should maintain this latter position, as the greatest part of the Neapolitan General *Carascosa's* division was yet on the left bank of the river. On the *night* of the 4th, the Neapolitan army was in full retreat, and soon the fury of the elements contributed to render its rout and dispersion complete: for at night-fall a dreadful storm rose on the sea-side: the waves, violently driven by the tempest, covered the road which runs along the coast, rushed into the mouths of the rivers, destroyed the bridges, and swelled the smallest rivulets to such a height that the passage of them could not be attempted but at the peril of life. Rain fell in torrents, darkness augmented the terror and the danger, and the passage of the Chienti became frightful. Entire ranks of soldiers, and a multitude of carriages with women, children, sick, and wounded, were washed into the sea by the fury of the waves. The shrieks of these miserable wretches resounded along the banks of the river, but in vain! no one thought of any but himself; all the links of subordination and even of affection were burst asunder. The morning of the 5th broke indeed with something of diminished horror, but it exhibited in full view the utter disorganization into which the army had been thrown. Troops of different divisions were every where intermixed: each individual pursued his own route: orders for arrangements were either not given or not obeyed; and the passage of the Tenna, of the Leta, of the Aso, of the Monocchia, and of the Tesino, was effected only under the most appalling difficulties. On the evening of the 5th, the exhausted fugitives, after a painful march of almost twelve leagues, reposed themselves near San Benedetto; the road which they had passed from Porto de Fermo being covered with stragglers, and a great many having dispersed among the mountains. General *Carascosa*, who led the rear-guard of this shattered army, took his position near Fermo, on the right bank of the Tenna, with about 3000 men, two pieces of cannon, and a few hundred cavalry. On the morning of the 5th, the Austrians marched into Civita Nuova and San Guisto.

The Austrians also entered the Neapolitan territory on the 12th of May. The retreat and the pursuit continued as far as the Volturno, which was reached on the 20th; and at this time the army of *Murat* may be said to have been annihilated. He had himself gone to Naples, and a military convention was settled at a house on the Volturno, called Casa Lanza, by which all the citadels, fortresses, arsenals, and ports were ceded to the allies, to be restored to Ferdinand. This treaty was ratified by *Carascosa* on the one side, and by the British minister at the court of Tuscany, and *Bianchi*, on the other. It had been preceded by another on the 13th between Prince *Cariati*, on the part of Caroline, Queen of Naples, and Captain Campbell, of the Tremendous English man-of-war, then lying in the gulf of Naples, who had threatened the city with a bombardment. The Lazzaroni had broken out with great exasperation against the government of *Murat* after his defeat at Tolentino; and the queen, being in much personal danger, now sought shelter under the protection of the British flag: she and

her four children accordingly went on board the Tremendous, and were carried to Trieste, under a solemn engagement not to return either to France or Italy, except with the permission of the Austrian government.

Possession of Naples was given to the Austrians on the 22d. *Murat* had left the army and gone thither three days before; and having taken leave of his wife and children, disguised in a grey coat, and with his hair cut close, he left his palace on foot on the 21st, and, going on board a boat with two or three officers, he escaped to the island of Ischia. Here he remained three days in disguise; and walking on the sea-shore, on the fourth morning, he saw a small vessel under full sail, belonging to the Duke *de la Rocca Romana*, his grand equerry, who with his aide-de-camp, the Marquis *Giuliano* came to join him. They immediately steered for France, and *Murat* landed at Cannes on the 29th of May, without an army, without money, without power: but, being no longer of any use to *Bonaparte*, he could not obtain from the implacable emperor even permission to proceed to Paris.

From this time, *Murat's* adventures would adorn the wildest pages of romance. He remained a few days at Toulon, and then secreted himself in a country-house, not far from Lyons: but, as soon as the news had reached him of the destruction of the French army at Waterloo, he resolved to proceed unknown to Havre de Grace, and implore the protection of the allies. With this view he freighted a vessel at Toulon, and his suite, consisting of those friends who came with him from Ischia, his baggage, and all the property that he had brought away, were put on board: but, by some fatal accident, the vessel set sail without him, leaving him in a state of such entire destitution that he had not even a change of linen. Alone, on the sea-shore, as he strained his aching eyes after the distant vessel, he saw a fishing-boat; this he hailed, and threw himself into it with the hope of rejoining his friends: but the wind freshening he was obliged to abandon the pursuit, and return to shore. In despair, hungry, and exhausted, he bent his steps as chance suggested; wandering about the woods and vineyards, unsheltered, and with scarcely any sustenance, for several days and nights; till at length, overcome with fatigue, he entered a farm, the master of which was absent. The old woman of the house, taking compassion on his situation, was preparing an omelet, when the farmer returned home: he had never seen the king, but he had remarked his portrait in the Marshal's saloon at the Tuileries, and on the Neapolitan coins. Impressed with the resemblance, and having likewise heard that he was somewhere lurking in the vicinity and that his place of concealment was the object of keen search, he immediately challenged his guest as being the royal fugitive in disguise: adding at the same time that, so far from taking advantage of the discovery which he had made, his house, person, and fortune were at the king's disposal, and should freely be risked for his protection. *Murat* remained here several days: but, having reason to suspect that he was discovered, he was obliged to quit this hospitable asylum for another. Here he was soon hunted out. On the night of the 13th of August, a detachment of sixty men, headed by one *Mocau*, the avidity of whose search was stimulated by a report that the king had an immense amount of gold and jewels about his person, silently and under favour of midnight darkness approached his retreat. The house was situated

on an eminence, and here again he was saved by the vigilance and fidelity of an old woman, who brought his provisions. As usual, she was keeping a sharp look-out while *Murat* slept, when she observed a light which the party had imprudently brought with them, moving along the hill that led to the house; and she instantly awakened the king, who was sleeping in his clothes with his fire-arms beside him. He snatched his pistols, slipped out at the back-door, and concealed himself within thirty yards of the house among a thick foliage of the vines. The troops examined every hole and corner of the house and garden; and *Murat* frequently heard them pass and repass him, venting their disappointment, and expressing their murderous hope that they might yet have the pleasure of cutting him to pieces and dividing his plunder.

As this sort of life was intolerable, he now resolved to escape to Corsica, and departed with three faithful friends in an open boat on the 22d of August: on the 24th they were overtaken by a storm which threatened their destruction; and on the following day they hailed a Corsican packet-boat, which they had scarcely boarded when they saw their own frail vessel sink to the bottom. Arrived at Bastia, he immediately proceeded to the village of Viscovato; where the mayor, having received no instructions to the contrary, allowed him to reside. The commandant of Bastia, however, proclaimed him to be an enemy to the king of France, and required his surrender at the head of a strong detachment of soldiers: but, to his surprise, he found *Murat* defended by 600 men in arms, to whom 200 veterans, chiefly officers who had formerly served under him, soon joined themselves. This circumstance contributed to the fatal delusion which he entertained, that, notwithstanding his late disasters, he was adored by the Neapolitans; and he quitted Bastia, went to Ajaccio, and purchased five small vessels, with an abundance of arms and ammunition. While making these insane preparations for war, his old acquaintance and aide-de-camp, Captain *Macerone*, landed in Corsica; stating that he was charged with a mission on the part of Austria, and authorized by the Emperor to offer *Murat* an asylum in his dominions, provided that he would take the title of the Count of *Lipona*, as his wife had already taken that of the Countess. He was at liberty to choose for his residence any town in Bohemia, Moravia, or Lower Austria: but he was to engage his word of honour not to quit the Austrian states without express permission, and to live in obedience to the laws. This note was given at Paris, September 1st, 1815, and signed on the part of the Emperor by Prince *Metternich*. After having contemplated the offer, *Murat* replied, "That it had come too late: that his destiny was cast: that he had waited in the midst of peril and distress, during three months, for the decision of the Allies; and that he had now resolved, by force of arms, to reconquer his kingdom or perish in the attempt." On graver reflection, however, he acquiesced in the proposals, and in consequence received an Austrian passport for Trieste, that he might rejoin his late Queen, now the Countess of *Lipona*. Weakly vacillating, however, and trusting to his good fortune, he returned to the mad resolution which he had just before abandoned.

On the night of the 29th September, he accordingly embarked with 200 armed men and about 30 officers, in six gondolas, with the design of landing at Salerno, about ten leagues from Naples: but a tempest

dispersed the little fleet, and exposed him to the danger of being captured by some Barbary corsairs which were cruising in those parts. However, on the 6th of October, he landed with General *Francichetti*, one colonel, and about 150 men, a very short distance from Pizzo, at the mouth of the gulf of St. Euphemia, some 50 leagues from Naples. He was received with acclamations, and encouraged to proceed to Pizzo, many of the inhabitants saluting him as King, and offering to share his fortunes. The Podesta of Pizzo he knew to be one of his most zealous adherents; and, as he was absent when *Murat* landed, the latter had sent to inform him of his arrival. In the mean time, marching with his little band on Monteleone, he met a colonel of gendarmerie, named *Trenta Capelli*, who was going to Pizzo. Him *Murat* saluted, and invited to join his standard: but the officer respectfully refused the invitation, and, pointing to a town with his finger, said, "That he knew no other sovereign than him whose flag was flying on that castle." *Murat* committed the unaccountable blunder of suffering this officer to proceed on his route: for no sooner had the colonel reached Pizzo, which *Murat* had just left, than he assembled a numerous party of peasantry, put himself at the head of it, and marched in pursuit of the invader. The latter, seeing a body of men coming up to him, thought that it was his friend the Podesta whom he expected with a reinforcement to join him before he reached Monteleone, and accordingly prepared to receive him. How great was his consternation and dismay, when a shout of "*Viva il Re Gioachimo!*" from his own party was answered by a discharge of musketry, which killed some and wounded others of them. At first he put himself on the defensive, but, finding that he was on the point of being surrounded, he endeavoured to regain the vessel from which he had landed: as however it was anchored too distant from the shore, he threw himself with about a dozen of his followers into a small boat, by means of which he hoped to reach the other in safety. This boat likewise was at anchor, and the fisherman to whom it belonged, fearing the loss of his property, seized the helm, while one of his comrades endeavoured to secure the person of *Murat*. *Trenta Capelli's* detachment, having now come up, seized their unhappy prisoner, and conducted him without delay to the governor of Monteleone, General *Munziante*, who shut him up in the citadel. *Murat* now showed his Austrian passport for Trieste, and unavailingly demanded his liberation. The intelligence of his capture was transmitted by telegraph to Naples, and in two hours the military commandant at Pizzo received, by the same means, an order to summon a court-martial instantly for the trial of the prisoner. On the 13th, he was brought before a council of war;—the proceeding was very short;—he was condemned to death, and shot on the same day at four o'clock, in the trenches of the citadel.

Thus perished *Joachim Murat*, an intrepid soldier and a skilful general: but the crown of Naples was to him a crown of poppies, and its sceptre a torpedo: the decision of his character was lost, its vigour extinguished, its genius quenched. He was a Frenchman by birth, and a Frenchman also in his heart: but, when he became King of Naples, if the interest of his adopted country interfered with the interest of that which merely gave him birth, his line of duty was palpable and not to be mistaken. When Austria, united with the great powers of Europe, was marching on France, it was impossible for the King of

Naples—for *Murat* at least—to be neuter: their failure or their success was equally his destruction: whichever party prevailed, it would dethrone him for his neutrality. He made his election reluctantly, not heartily, and joined the Allies. The momentary success of *Bonaparte* unsettled him: his old connexions, feelings, and friendships revived: neither party trusted him: he hesitated, temporized, and was destroyed. There was something base and unmanly in presenting the Austrian passport at Monteleone for his liberation, after he had obtained that passport surreptitiously, under false pretences, and had broken the terms on which it had been granted by a mad appeal to arms against the power which gave it; and his life was the forfeit of his folly.

FROM THE EDINBURGH PHILOSOPHICAL JOURNAL.

Account of a Man who lived Ten Years after having swallowed a Number of Clasp-Knives. By ALEXANDER MARCET, M.D. F.R.S. late Physician to Guy's Hospital.

In the month of June 1799, John Cummings, an American sailor, about twenty-three years of age, being with his ship on the coast of France, and having gone on shore with some of his shipmates, about two miles from the town of Havre de Grace, he and his party directed their course towards a tent which they saw in a field, with a crowd of people round it. Being told that a play was acting there, they entered, and found in the tent a mountebank, who was entertaining the audience by *pretending* to swallow clasp-knives. Having returned on board, and one of the party having related to the ship's company the story of the knives, Cummings, after drinking freely, boasted that he could swallow knives as well as the Frenchman. He was taken at his word, and challenged to do it. Thus pressed, and though (as he candidly acknowledged in his narrative) "not particularly anxious to take the job in hand, he did not like to go against his word, and having a good supply of grog inwardly," he took his own pocket-knife, and on trying to swallow it, "it slipped down his throat with great ease, and by the assistance of some drink, and the weight of the knife," it was conveyed into his stomach. The spectators, however, were not satisfied with one experiment, and asked the operator "whether he could swallow more?" his answer was, "all the knives on board the ship;" upon which, three knives were immediately produced, which were swallowed in the same way as the former; and, "by this bold attempt of a drunken man," (to use his own expressions,) "the company was well entertained for that night." The next morning he had a motion, which presented nothing extraordinary; and in the afternoon he had another, with which he passed one knife, which however was not the one that he had swallowed first. The next day he passed two knives at once, one of which was the first, which he had missed the day before. The fourth never came away, to his knowledge, and he never felt any inconvenience from it. After this great performance, he thought no more of swallowing knives for the space of six years.

In the month of March 1805, being then at Boston in America, he was one day tempted, while drinking, with a party of sailors, to boast

of his former exploits, adding, that he was the same man still, and ready to repeat his performance; upon which a small knife was produced, which he instantly swallowed. In the course of that evening he swallowed five more. The next morning crowds of visiters came to see him; and in the course of that day he was induced to swallow eight knives more, making in all fourteen.

This time, however, he paid dearly for his frolic; for he was seized the next morning with constant vomiting, and pain at his stomach, which made it necessary to carry him to Charleston hospital, where, as he expresses it, "betwixt that period and the 28th of the following month, he was safely delivered of his cargo."

The next day he sailed for France, on board a brig, with which he parted there, and embarked on board another vessel* to return to America. But during her passage, the vessel, which was probably carrying on some illicit traffic, was taken by His Majesty's ship the Isis, of 50 guns, and sent to St. John's, Newfoundland, where she was condemned, while he himself was pressed and sent to England on board the Isis. One day, while at Spithead, where the ship lay some time, having got drunk, and, as usual renewed the topic of his former follies, he was once more challenged to repeat the experiment, and again complied, "disdaining," as he says, "to be worse than his word." This took place on the 4th December, 1805, and in the course of that night he swallowed five knives. On the next morning the ship's company having expressed a great desire to see him repeat the performance, he complied with his usual readiness, and, "by the encouragement of the people, and the assistance of good grog," he swallowed that day, as he distinctly recollects, nine clasp-knives, some of which were very large; and he was afterwards assured, by the spectators, that he had swallowed four more, which, however, he declares he knew nothing about, being, no doubt, at this period of the business, too much intoxicated to have any recollection of what was passing. This, however, is the last performance we have to record; it made a total of at least thirty-five knives, swallowed at different times, and we shall see that it was this last attempt which ultimately put an end to his existence.

On the following day, 6th of December, feeling much indisposed, he applied to the surgeon of the ship, Dr. Lara, who, by a strict inquiry, satisfied himself of the truth of the above statement; and as the patient himself thankfully observes, administered some medicines, and paid great attention to his case, but no relief was obtained. At last, about three months afterwards, having taken a quantity of oil, he felt the knives (as he expressed it) "dropping down his bowels;" after which, though he does not mention their being actually discharged, he became easier, and continued so till the fourth of June following (1806,) when he vomited one side of the handle of a knife, which was recognised by one of the crew to whom it had belonged. In the month of November of the same year, he passed several fragments of knives, and some more in February, 1807. In June of the same year, he was discharged from his ship as incurable; immediately after which he came to London, where he became a patient of Dr. Babington, in Guy's Hospital. He was discharged after a few days, his story appearing altogether

* The "Betty" of Philadelphia.

incredible, but was readmitted by the same physician, in the month of August, his health during this period having evidently become much worse. It was probably at this time that the unfortunate sufferer wrote his narrative, which terminates at his second admission into the hospital. I find, however, by the hospital records, that, on the 28th of October, he was discharged in an improved state; and he did not appear again at the hospital till September, 1808, that is, after an interval of nearly a year since his former application. He now became a patient of Dr. Curry, under whose care he remained, gradually and miserably sinking under his suffering, till March, 1809, when he died, in a state of extreme emaciation.

The following interesting letter from Dr. Lara, (probably to Dr. Curry, as it was found among his papers,) supplies some of the particulars respecting the patient's illness while on board the Isis.

"Sir,—William Cummings, aged twenty-nine years, a seaman belonging to H. M. S. Isis, was reported "sick" to me, as surgeon to that ship, on the 6th of December, 1805. He complained of excessive pain in the stomach and bowels, incapacity of retaining any thing on the stomach, and severe pain in walking or standing erect. These symptoms he attributed to having swallowed, during the three preceding days, nineteen or twenty pocket-knives, and one paper knife-case; the latter he stated to have been presently returned, but all the former retained!

"Incredulous of this statement, I made every possible inquiry; and, on the evidence of those who solemnly declared they witnessed the fact, the number of knives actually taken into the stomach appeared to be fourteen! The greater part of these knives were nearly four inches long, and full one inch in their extreme breadth. It seems, he sought no remuneration for this extraordinary exploit, but a plentiful supply of what is termed "grog" at sea, *i. e.* spirits and water; nor did he apprehend any attendant danger, as he had (he said), a few years previously, swallowed eighteen knives at Boston in America, of which he got rid in four days, without the least inconvenience.

"I must here observe, that an inhabitant of Boston, whom I met at St. John's, Newfoundland, in the summer of 1806, assured me, that the fact of a man named William Cummings having swallowed several knives was well remembered by many inhabitants of Boston, and that a number of knives said to have been expelled by this man were still preserved in the Infirmary of that city.

"How to act in this unparalleled case, I confess I knew not. He expressed himself certain, (having frequently, he averred, swallowed one or two knives in a day, and as often discharged them, without inconvenience) that every knife had passed the stomach; and though it might not have been so (as it since proved), any attempt to force them up appeared to me to be attended with much danger; nor did I suppose it more expedient or less hazardous to attempt their expulsion downward. I trusted, therefore, to the efforts of nature, merely directing some castor-oil to be given at intervals, with or without opium, according to the degree of pain, and urgency of the vomiting, which immediately occurred on his sitting up, or swallowing any thing solid. Glysters of thick water-gruel were also frequently injected.

"In about a week from his first application, the vomiting was less

frequent, and the matter ejected of a lateritious colour; the stools were black and thin. Some medical friends now suggested a trial of the sulphuric acid, in which I acquiesced. For a fortnight he took thirty or forty drops of the diluted acid four or five times a day, with tincture of opium at intervals, and a gentle laxative when costive. His diet during this time was sage, rice, tea, bread, cheese, and beef-soup, most of which were retained. The matter ejected from the stomach had gradually acquired a darker colour, as if impregnated with iron, or mixed with ink. The stools were as before described. The pulse continued unaffected; but he was evidently emaciated.

"Notwithstanding these appearances, a general disbelief prevailed as to the cause to which this poor man attributed his complaints, and which disbelief was strengthened by several, who had before declared they had seen him swallow the knives, prevaricating in their evidence on being repeatedly examined. I was also blamed for keeping the man from his duty, and charged with favouring an impostor. I would not, however, discharge him. At this time my senior assistant, Mr. Thomas Watts, requested permission to try the effects of the muriated tincture of iron, conceiving, that if the system was brought under its influence, the expulsion of the knives might be proved. I consented to the trial, and Cummings took ten drops every four hours, daily increasing each dose by a drop, for a fortnight. No effect was however produced, except tormina, which symptom opium did not relieve so readily as heretofore; his appetite continued good, except for animal food. Under these circumstances, he was directed (having hitherto kept in bed) to sit up the whole of the day. For a few days he always vomited on rising; but within a week he lost that symptom, and the vomiting seldom occurred oftener than three times in the twenty-four hours, and then mostly after taking tea or other liquid. Though these fluids were returned a very few minutes after they were swallowed, the matter vomited had always the appearance of ink and water. The exhibition of any medicine was now suspended, except for the obviating of costiveness.

"Towards the close of January, 1806, he was evidently more emaciated; yet he moved about, and at intervals performed the duty of a sweeper. Until the 26th of the following April, there was but little alteration: he then complained of much pain, and incessant vomiting. Opium, the warm bath, and laxatives were employed, but without any apparent advantage; yet, at the end of May, the vomiting was much less in quantity and in frequency; the pain was also relieved, being felt only on his attempting to stand erect; his appearance was also improved, and he was discharged to the performance of such light duties as he could execute.

"On the 6th of June, he brought to me the half of a horn handle of a knife, which he declared he had thrown off his stomach that morning, without any particular effort of attending pain.

"Nearly five months now elapsed without any particular occurrence. He gathered strength and flesh, ate voraciously, drank proportionably, and performed various easy duties in the ship; though, when questioned, he complained of pain when standing erect, and of vomiting at intervals.

"On the 8th of November, he passed, in two alvine evacuations, the blade, and half the horn handle of a knife; he then complained of

much pain in the abdomen, and was relieved by a dose of castor-oil combined with tincture of opium. The 12th of November he passed another portion of iron, with much pain, but which subsided on the expulsion being effected. The 30th of November I was removed from the Isis; at which time Cummings expressed himself to be easier than he had long been, though suffering from pain, and vomiting at intervals.

"The surgeon who succeeded me (Mr. Peter Kelly) wrote to me, on the 23d of January, 1807, to say that Cummings was much the same as when I left him, and had passed, in the early part of the month, the iron portion of the handle of a knife. In May, 1807, I received a farther communication from Mr. Kelly. He stated, that Cummings continued much as usual; that he had passed several pieces of iron, one of which had excited extreme pain, from its having lain transversely on the rectum; and that one piece, with a hook-like end, had been ejected from the stomach, with excruciating pain, and hæmorrhage to the amount of two pounds of blood. Mr. Kelly further states that the expulsion of the different pieces of iron was generally preceded by severe pain in the abdomen.

"After the last communication from Mr. Kelly, I never heard any thing further respecting Cummings, until I received your favour of the 22d instant. If the incomplete account I have here given of this extraordinary case shall prove at all satisfactory I shall be satisfied. I have only now to add, that of the portions of knives expelled, I have six pieces of iron, and two of horn. I trust you will have the goodness to favour me with an account of the examination of the stomach; in the expectation of which, I remain, Sir,

"Your very humble servant,

"B. Lara."

The following very curious narrative, was drawn up by Cummings himself, and entitled, "A miraculous Recovery of a Seaman, who swallowed a number of Knives at three different times, as you see in this little book;" and though it contains most of the particulars already stated, we shall follow Dr. Marcet in giving it in Cummings' own words.

"John Cummings, thirty-two years of age, was, in the month of June, 1799, in France. Upon a Sunday afternoon, he and a party of his shipmates went out to the country, two miles from the town of Havre de Grace, where, upon their approaching a large field, observed a great number of men and women standing, and a large tent that was placed upon the ground. Being anxious to know what they had been about, steered their course towards the place where the multitude stood; by inquiring of the first they met with, was informed it was a play. Directly they collected a livre each, and entered inside the scenes. They had full view of the performance; but by observing the play-actors swallowing knives, induced him to try the experiment. That night they were in time enough on board, where they began to enjoy the former part of the night as follows:—After drinking very hearty, one of the company opened the story concerning the above play-actors, which he repeated that it was an extraordinary affair to swallow knives. The author made answer directly, and told him that he could swallow knives as well as they could. The company present took notice of the above answer being made so quick, and for the

curiosity of the circumstance, made a serious inquiry if he was man enough to perform what he had already stated. He did not like to go against his word, neither was he anxious to take the job in hand; but, by having a good supply of grog inwardly, he took his own pocket-knife, and tried it first, which slipped down his throat with great ease; and, by the assistance of some drink and the weight of the knife, conveyed it into his stomach. But still the spectators seemed not satisfied with one, but made further inquiry, if he could swallow any more. He replied in a word, "All the knives on board the ship." By this answer, there was three more knives presented upon the table, which he swallowed in few minutes, the same way as the former. And by this bold attempt of a drunken man, the company was well entertained for that night. Next morning nature worked him to a stool, but passed nothing extraordinary; at four o'clock the same afternoon had another, when he passed one, and, what was more surprising to him, that was not the first knife he swallowed; the next day he passed two at once, and one of them being the first knife he swallowed; the fourth, never knew any thing about it, nor ever knew whether it came away or remained in his bowels. But yet he never suffered pain by them that time, and was safely delivered without any assistance from a surgeon; and shortly afterwards took his departure from France, and never thought on swallowing any more knives for the space of six years; after which, you shall see as follows:

"Boston, March 13, 1805, was in company, where he gave his report of his success in swallowing knives in France, in June, 1799. Two or three of the company told him plain to his face, that it was impossible for any man to do such a thing, and that it was nothing but false report, which he took it very highly affronted; but, after considering a short time, told the company he was the same man still, and, if it was agreeable, that he would satisfy their curiosity. One small knife was presented to him, which he swallowed instantly; in the course of that night he swallowed five more, which made six in all. This uncommon report soon came to a head in the neighbourhood, as he had next morning a thousand visiters; but he gave very few of them admittance. Happened in the course of that day that he swallowed eight more, and six the night before, which made fourteen; and that was the 14th of the month; so he had swallowed a knife for every day the month was old. Next morning was the 15th; he was taken very ill, with constant vomiting and pain in his stomach. Directly he was brought to Charleston Hospital, and betwixt that period of time and the 28th following, was safely delivered of his cargo, and the whole of them are preserved in the Infirmary of that city. Upon the 29th he shipped himself on board of a brig bound to France, where he left that brig, and shipped on board of the Betty of Philadelphia; in their passage to America, was taken by his Majesty's ship Isis, fifty guns, and sent into St. John's in Newfoundland, where she was condemned, and some of the hands pressed. Being a few months laying there, got orders to sail for England. After twenty-five days agreeable passage, made the land, and came-to at Spithead; being there for some days, and got on board fresh provisions of all kinds, and amongst that plenty of spirituous liquors, after drinking very hearty, he told of his success in swallowing knives in France and in America. None of his shipmates would give credit to his history, which some-

body present was inhuman enough to offer him a knife. Upon disdaining to be worse than his word, he proceeded immediately to perform his part of the business; that night being the fourth of December, 1805; and in the course of that night he swallowed five knives. Next morning, being the 5th day of the month, the ship's company was anxious to see the performance renewed the second time: by the encouragement of the people, and the assistance of good grog, (and his lot was ordained to be miserable hereafter in consequence of the same,) he swallowed nine that day to his own knowledge; and the spectators informed him afterwards that he swallowed four more, that he knows nothing about: they were all clasp-knives, and some of them very large. Upon the 6th of December he was under the necessity of applying to a doctor, who was surgeon of the ship. The doctor, finding he was in a bad situation, made a strict inquiry of the principal men that were eye-witness to the transaction, which the captain and the rest of the officers found to be a true story. The surgeon, indeed, never neglected to pay the greatest attention, and prescribed what medicines he thought proper towards his relief: but all to no effect. At the expiration of three months, by taking a quantity of oil, he felt them dropping down to his bowels. In a few days after he was able to walk any part of the ship, and in that continuance till the 4th of June following, when he vomited one side of the handle of a knife, marked Cunningham, the same man that it belonged to, in the same ship; and, by asking him if he knew any thing about such a knife, he directly confessed that it was part of the knife Cummings swallowed of his. The surgeon keeps the said piece in his possession. Four months passed without any thing extraordinary having happened. On the 4th of November he passed another piece, the same as the former, with the lining of a knife along with it; two more he passed during that month. In February following vomited another lining of a knife; in the course of that month passed four more pieces, and since nothing extraordinary came away.

"June 12th, 1807, he was discharged the ship, in consequence of his complaint, and likewise being found, at the survey, unserviceable; after which, he was admitted into Guy's Hospital, under the care of Dr. Babington. Great many never believed such a circumstance. After five weeks being in the hospital, was presented out, and was in lodgings for the space of five weeks; but, finding himself getting worse, was obliged to make the second application, and was readmitted under his physician again."

FROM THE SAME.

On Machinery for Calculating and Printing Mathematical Tables.

By CHARLES BABBAGE, Esq. F. R. S. Lond. and Edin. &c.

AMONG the brilliant inventions which have distinguished the present age, the machinery invented by Mr. Babbage for performing intellectual labour, is entitled to a prominent place. Low as that species of mental exertion undoubtedly is, when the mathematician performs the monotonous round of arithmetical calculations, in which neither the power of combination nor of judgment is called into ac-

tion; yet we were not prepared to see even these humbler functions placed under the surveillance of wheels and pinions: and hence the first intelligence of a calculating machine has been received with as much incredulity by the wise as by the vulgar.

The object which Mr. Babbage had in view in constructing this new machinery, was to produce printed copies of any mathematical tables, *without the possibility of an error existing in a single copy*. This result he proposed to attain solely by machinery, which, at the same time, made the calculations and composed, with a proper type, the tables when computed. At the commencement, of course, of these operations, certain preliminary calculations must be made; and, at intervals, the machinery must be set to these numbers; but, in some cases, when once set, the machine will continue working to the end of the tables.

In these contrivances, there are two distinct parts, viz. *one*, by which the tables are *computed*, and the *other*, by which they are *composed*; but, as the actual execution of such machinery requires a great expense both of time and money, Mr. Babbage has contented himself with sketches on paper, accompanied by short memoranda, by which his contrivances may be at any time more fully developed; and, when any new principles have been introduced, he has examined their actions by models executed on purpose. In order, however, to prove the practicability of these views, he has finished a small engine, by which the calculations are accomplished, and which has actually computed the following table, in which the second differences are constant.

Table computed by Mr. Babbage's Arithmetical Engine, from the Formula $x^2 + x + 41$.

41	131	383	797	1373
43	151	421	853	1447
47	173	461	911	1523
53	197	503	971	1601
61	223	547	1033	1681
71	251	593	1097	1763
83	281	641	1163	1847
97	313	691	1231	1933
113	347	743	1301	2021

The figures, as they are calculated by the machine, are not exhibited to the eye, as in sliding-rules, and similar methods, but are actually presented to the eye on two opposite sides of the machine; the number 593, for example, appearing in figures before the person employed in copying. When the machine was engaged in calculating the preceding table, a friend of the inventor undertook to write down the numbers as they appeared. In the earlier numbers, the copyist, in consequence of writing quickly, rather more than kept pace with the engine, but as soon as four figures were required, the machine was at least equal in speed to the writer. At another trial, *thirty-two* numbers of the same table were calculated in *two minutes and thirty seconds*; and, as these contained *eighty-two* figures, the engine produced *thirty-three* every *minute*. Another time it produced *forty-four* figures in a minute; and, as the machine may be moved uniformly by

a weight, this rate of computation may be maintained for any length of time; and it is probable that few writers are able to copy, with equal speed, for many hours together.

Notwithstanding the defective workmanship in this first machine, its computations are wonderfully accurate; and some very skilful mechanics to whom Mr. Babbage has shown it in confidence, are of opinion that it may be carried to any extent. Its parts, indeed, are few, but frequently repeated; and, though it contains many wheels, yet only a few of them move at the same time, so that its simplicity is greater than that of many machines in common and constant use.

There is one circumstance in the construction of this machine, which is of considerable importance in making larger ones, viz. that, though its wheels are numerous, yet, by a peculiar contrivance, any error produced by accident, or by a slight inaccuracy in one of them, is corrected as soon as it is transmitted to the next, and in such a manner as effectually to prevent any accumulation of small errors from producing a wrong figure in the calculation.

The machine for composing with types, has not yet been actually constructed; but, from several models which Mr. Babbage has made, and from numerous experiments which he has tried, there can be no doubt of its complete success*. When put up, the composing machine will contain about 30,000 types, which are put in their places by children; but the person who attends the engine has a method of ascertaining, in less than half an hour, *if any one individual of this number is misplaced.*

As the engine for computing tables by the method of differences, is the only one which Mr. Babbage has yet completed, he has, in his letter to Sir Humphry Davy, confined himself to a statement of the powers which that method possesses, and as this statement is highly interesting, we shall give it in his own words.

"I would, however, premise, that if any one shall be of opinion, notwithstanding all the precautions I have taken and means I have employed to guard against the occurrence of error, that it may still be possible for it to arise, the method of differences enables me to determine its existence. Thus, if proper numbers are placed at the outset in the engine, and if it has composed a page of any kind of table, then by comparing the last number it has set up with that number previously calculated, if they are found to agree, the whole page must be correct; should any disagreement occur, it would scarcely be worth the trouble of looking for its origin, as the shortest plan would be to make the engine recalculate the whole page, and nothing would be lost but a few hours' labour of the moving power.

Of the variety of tables which such an engine could calculate, I shall mention but a few. The tables of powers and products published at the expense of the Board of Longitude, and calculated by Dr. Hutton, were solely executed by the method of differences; and other tables of the roots of numbers have been calculated by the same gentleman on similar principles.

As it is not my intention in the present instance to enter into the theory of differences, a field far too wide for the limits of this letter, and which will probably be yet further extended in consequence of

* A working-model of this part of the machinery has been recently constructed.

the machinery I have contrived, I shall content myself with describing the course pursued in one of the most stupendous monuments of arithmetical calculation which the world has yet produced, and shall point out the mode in which it was conducted, and what share of mental labour would have been saved by the employment of such an engine as I have contrived.

The tables to which I allude are those calculated under the direction of M. Prony by order of the French Government;—a work which will ever reflect the highest credit on the nation which patronized, and on the scientific men who executed it. The tables computed were the following.

1. The natural sines of each 10,000 of the quadrant calculated to twenty-five figures with seven or eight orders of differences.

2. The logarithmic sines of each 100,000 of the quadrant calculated to fourteen decimals with five orders of differences.

3. The logarithm of the ratios of the sines to their arcs of the first 5000 of the 100,000ths of the quadrant calculated to fourteen decimals with three orders of differences.

4. The logarithmic tangents corresponding to the logarithmic sines calculated to the same extent.

5. The logarithms of the ratios of the tangents to their arcs calculated in the same manner as the logarithms of the ratios of the sines to their arcs.

6. The logarithms of numbers from 1 to 10,000 calculated to nineteen decimals.

7. The logarithms of all numbers from 10,000 to 200,000 calculated to fourteen figures with five orders of differences.

Such are the tables which have been calculated, occupying in their present state seventeen large folio volumes. It will be observed, that the trigonometrical tables are adapted to the decimal system, which has not been generally adopted even by the French, and which has not been at all employed in this country. But, notwithstanding this objection, such was the opinion entertained of their value, that a distinguished member of the English Board of Longitude, was not long since commissioned by our Government to make a proposal to the Board of Longitude of France, to print an abridgment of these tables at the joint expense of the two countries; and £5000 were named as the sum our Government was willing to advance for this purpose. It is gratifying to record this disinterested offer, so far above those little jealousies which frequently interfere between nations long rivals, and manifesting so sincere a desire to render useful to mankind the best materials of science in whatever country they might be produced. Of the reasons why this proposal was declined by our neighbours, I am at present uninformed; but, from a personal acquaintance with many of the distinguished foreigners to whom it referred, I am convinced that it was received with the same good feelings as those which dictated it.

I will now endeavour shortly to state the manner in which this enormous mass of computation was executed; one table of which (that of the logarithms of numbers), must contain about eight millions of figures.

The calculators were divided into three sections. The first section comprised five or six mathematicians of the highest merit, amongst whom were M. Prony and M. Legendre. These were occupied entire-

ly with the analytical part of the work; they investigated and determined on the formulæ to be employed.

The second section consisted of seven or eight skilful calculators, habituated both to analytical and arithmetical computations. These received the formulæ from the first section, converted them into numbers, and furnished to the third section the proper differences at the stated intervals.

They also received from that section the calculated results, and compared the two sets, which were computed independently for the purpose of verification.

The third section, on whom the most laborious part of the operations devolved, consisted of from sixty to eighty persons, few of them possessing a knowledge of more than the first rules of arithmetic: these received from the second class certain numbers and differences, with which, by additions and subtractions in a prescribed period, they completed the whole of the tables above mentioned.

I will now examine what portion of this labour might be dispensed with, in case it should be deemed adviseable to compute these or any similar tables of equal extent by the aid of the engine I have referred to.

In the first place, the labour of the first section would be considerably reduced; because the formulæ used in the great work I have been describing, have already been investigated and published. One person, or at the utmost two, might therefore conduct it.

If the persons composing the second section, instead of delivering the numbers they calculate to the computers of the third section, were to deliver them to the engine, the whole of the remaining operations would be executed by machinery, and it would only be necessary to employ people to copy down as fast as they were able the figures presented to them by the engine. If, however, the contrivances for printing, were brought to perfection and employed, even this labour would be unnecessary, and a few superintendants would manage the machine and receive the calculated pages set up in type. Thus, the number of calculators employed, instead of amounting to ninety-six, would be reduced to twelve. This number might, however, be considerably diminished; because when an engine is used, the intervals between the differences calculated by the second section may be greatly enlarged. In the tables of logarithms, M. Prony caused the differences to be calculated at intervals of 200, in order to save the labour of the third section; but as that would now devolve on machinery, which would scarcely move the slower for its additional burden, the intervals might properly be enlarged to three or four times that quantity. This would cause a considerable diminution in the labour of the second section. If, to this diminution of mental labour we add that which arises from the whole work of the compositor being executed by the machine, and the total suppression of that most annoying of all literary labour, the correction of the errors of the press, I think I am justified in presuming, that if engines were made purposely for this object, and were afterwards useless, the tables could be produced at a much cheaper rate: and of their superior accuracy there could be no doubt. Such engines would, however, be far from useless: containing within themselves the power of generating to an almost unlimited extent, tables whose accuracy would be unrivalled, at an expense comparatively moderate, they would become active agents in reducing the abstract

inquiries of geometry to a form and an arrangement adapted to the ordinary purposes of human society.

I should be unwilling to terminate this letter, without noticing another class of tables of the greatest importance, almost the whole of which are capable of being calculated by the method of differences. I refer to all astronomical tables for determining the positions of the sun or planets. It is scarcely necessary to observe, that the constituent parts of these are of the form $a \sin \theta$, where a is a constant quantity, and θ, is what is usually called the argument. Viewed in this light, they differ but little from a table of sines, and like it may be computed by the method of differences."

Having thus given our readers a succinct description of the nature and objects of Mr. Babbage's arithmetical machinery, we have only to express our hope that the British government, or some of those institutions which it so liberally supports, will afford Mr. Babbage the means of constructing a large engine, and hold out to him some inducement to withdraw his attention from more alluring studies, and devote it to the completion of an invention which will do honour to his country, and to the age in which we live.

Edinburgh, August 1, 1822.

FROM THE QUARTERLY JOURNAL OF SCIENCE.

Narrative of a Journey from Egypt to the Western Coast of Africa, by Mahomed Misrah. *Communicated by an Officer serving in Sierra Leone.*

To the Editor of the Quarterly Journal.

Fort Thornton, Sierra Leone, April 8, 1821.

Sir,—At the request of several of my friends, of one in particular, a correspondent of yours, now on a visit to this colony, I am induced to send you an account of a journey performed by a Mahomedan priest, over land from Egypt to the western shores of Africa; the details of which I have collected at several recent interviews. The facts were originally noted down for the purpose of gratifying my own curiosity, and of serving me as a guide in crossing Africa from west to east, in an expedition to explore the termination of the Niger, which I have in contemplation should a favourable opportunity offer. The eyes of Europe, generally, have been long turned towards Africa; but the attention of Great Britain, particularly, has been for the last thirty years directed, with a degree of praiseworthy anxiety, towards the prosecution of discovery in that vast continent, the melioration of the condition of her long neglected inhabitants, their civilization, and the subsequent inculcation of morality and religion: to forward this grand design, worthy of the character of such a nation as England, expeditions on the most expensive scale, and on apparently the wisest plans, have been fitted out, and as it were, thrust into Africa from various points; but although neither expense, ingenuity, nor perseverance have been spared, the success has hitherto been so limited from disasters painful to recollect, that we are at this day in possession of little more information than twenty-five years ago, respecting regions still untraversed by Europeans, and known only by reports

and occasional information gathered from native travellers, who too often relate as facts, on their own knowledge, what they have only heard from others; and thus furnish matter for hypotheses concerning the interior divisions of this *terra incognita*, and the course of its mysterious river, which has been successively represented to flow towards every point of the compass.

I regret much that the hurry of making arrangements preparatory to conducting a mission into the Solima and Sankara countries, whither I shall set off in a few days, does not allow me sufficient time to put the route of the priest in a shape more fit to meet the public eye; but I trust that its authenticity, and the care which I have bestowed in sifting the information, will in some measure compensate for this deficiency; and although the matter collected is not of a nature to throw much light on the probable termination of the Niger, yet it may be of consequence in detecting the fallacious opinions of those fanciful speculators, who direct the courses of rivers in their chambers, and eventually draw conclusions, with which they are (naturally enough) satisfied themselves, but which can produce no other effect upon the generality of their readers, than a conviction that the result of their labours is to involve in greater doubt and obscurity a problem which never can be solved but by ocular demonstration.

Mahomed Misrah, a Moslem, was born in Alexandria about forty-five years ago. When a young man, he remembers an army of white people taking possession of his country, who about three years afterwards were driven from it, having been beaten in a battle with other white people, who spoke a different language. Mahomed was within hearing of the guns, but did not see the engagement, he, and a great many more of his countrymen having retired from the scene of action through fear. A few years after this period, feeling himself conscientiously impelled to propagate his belief, he set out on a journey westward along the shores of the Mediterranean, and travelled as far as Fez, where, finding an insurmountable barrier in the great desert of Sahara, to his advance to the southward amongst the Kafir nations, he turned his face towards the rising sun, retraced his steps to Alexandria, and (to use his own expressions) sat down there for some time, uncertain as to his future intentions; at length, without any fixed or determinate plan, he departed from Alexandria, and following a southerly course, arrived in nine days at Ariff, four at Dongola, and in ten arrived at Sennaar, a low sandy country, abounding with camels, horses, and cattle; the Nile, which he describes as running from the S. W. or country of the Kafirs, where it bears the name of Baher el Abeed, is about a mile in breadth here, and is slow and majestic in its progress; the natives of Sennaar are Mahomedans, and the king is named Khamadoo.

Turning his back upon Sennaar, the Kolunjumi (Red Sea) and Mecca, he arrived in one day at the eastern frontiers of the kingdom of Kordofan, which is only habitable on the borders, the centre being a desert of ten days' journey across, and not to be traversed during the dry season: here Mahomed was under the necessity of awaiting the departure of a caravan which took some time in collecting, and did not eventually set out till the wet season had been pretty well advanced. In this part of his journey, the priest suffered much from the scarcity of water, that which they carried in skins having evapo-

rated, and there being no oasis or well in the desert, at which they could procure any; in this dilemma, they spread their garments at night on the sand to catch the rain or dew, and in the morning, a scanty supply was procured by squeezing them; which (says the priest) is the practice always resorted to in such cases, and it is for the sake of this advantage, that the journey is always performed during the rains. The king of Kordofan is named Musa Bâh, and his subjects are rigid Mahomedans.

After having traversed this desert, which occupied eleven days, and having skirted the northern boundaries of Dar Fur, he found himself at Noomdroo, the most eastern town of Wadda, or Dar Bergoo; in fifteen days more, pursuing a direction to the N. W. he arrived at Warra, the capital of that country. This is a very powerful kingdom, and of much greater extent from east to west than is generally represented in the maps; the sovereignty is held by Saboo, a prince of unlimited authority, who occasionally sends large armies into the field, but seldom accompanies them himself; his troops are not furnished with fire-arms, but they maintain desperate conflicts with the spear, an instrument which they direct with much precision, and handle with great dexterity: many of the natives of Wadda are great travellers, and trade to countries far distant; their beasts of burden, like as in most of the sandy districts of Africa, is the camel. From Warra proceeding to the northward of west, in two days he fell in with Fitrée Alifitrée or Belála, situated on the large lake of that name; this lake receives the contents of a large river (perhaps the Gir of Ptolemy, the Baher el Miselad of Browne) which rising among some small mountains or hills on the confines of Kordofan, flows to the westward through Dar Fur, and afterwards in a north-westerly direction till it reaches its termination where its breadth is about four hundred yards. Mahomed has made the circuit of Lake Fitu, and positively declares, that it has no outlet; this stubborn fact, may (with the sequel of his route, which is perfectly consistent, and shows that he crossed no river of any magnitude between Fitri and Nufi) prove a serious objection to the continuation of the Gir, which has been lately supposed to flow from Lake Fitri, and after traversing an immense extent of country, to unite with the Niger, and thus account for the quantity of rain-water, which finds its way to the Bight of Benin through the broad channels of its numerous rivers. The soil around Lake Fitri during the dry season is soft and slimy, owing to the retiring of the water, and at this time, myriads of musquitoes are engendered, which cause a visit to its banks to be very disagreeable. The natives of the country are Mahomedans, carry on a great trade with the Arabs, but are subject to the kingdom of Wadda, to which they pay an annual tribute.

A journey of one day north-west, brought the priest to Baghermi, a fertile country, of which he says little. The prevailing religion of the inhabitants is Mahomedanism; they trade with the Arabs, and pay tribute to Bornou: he reached Katucko in one day more, and rested the day following at Mandara, where he found himself only one day to the eastward of Bornou Brinée, the principal town of the extensive kingdom of that name; Katucko and Mandara are both dependent upon Bornou; the chief or headman of the latter is known by the name of Abdul Lahi. Bornou Brinée is a large and populous town,

and is much resorted to from all parts of northern Africa; the merchandise, however, is entirely conveyed to it upon camels and horses, and Mahomed Misrah declares there is no river of consequence within ten days' march of it: being questioned as to its distance from the Niger, he pointed towards the south, saying, "Three days will carry you to Mooskoo, and seven days to the country of the Kafirs; the Joliba runs through that country, but is known there by a different name." That part of the kingdom of Bornou through which he passed, (with the exception of Brinée, which is surrounded with sand,) is more fertile than any he met with during the whole of his journey; abundance of vegetable provision and plenty of fine corn are produced, and extensive pasturages crowded with cattle are seen in all directions. The natives are Moslems, and their king, Ahamdoo, receives tribute from most of the circumjacent nations.

Departing westward from Bornou Brinée, he arrived in three days at Angaroo; one day S. W. by W. brought him to Tassina, three days west to Awoyak, and three days W. by S. to Kano, generally written Cano, Ghano, and Gano; all these countries are flat, clear of brushwood and bush, and like Bornou produce plenty of corn. Kano is a kingdom which ranks high among the nations of northern central Africa, and every thing said of it by the priest corroborates the statements already given by others; the natives are amazingly adventurous and persevering; they trade to Nufi, Timbuctoo, and various other remote countries situated along the north bank of the Niger, the inhabitants of which are known by the appellation of Muley Ismahel's people, a great Arab chief, whose empire extends along the southern skirts of the great desert. He performed the journey from Kano to Kashana, generally written Kashna and Kassina, in five days, travelling W. by S. through districts sometimes verdant, occasionally sandy; the natives are Mahomedans, of a very deep black complexion, of commercial habits, and not disposed to quarrel, or make war; the country of Zanfara lies to the southward of Kashana, according to information received there by the priest.

Proceeding in a direction considerably to the southward of west, he arrived after a tedious journey of twenty days at the town of Nufi, situated on the Niger, which is here called Kuorra, is only about four hundred yards broad, and pursues a course a little to the southward of east with great rapidity, into the nations of the Kafirs. On his route from Kashana, he passed many inconsiderable rivers running from north to south, traversed a country tolerably clear and fertile, though occasionally interspersed with extensive deposits of sand, and as he approached Nufi, met with many villages, at all of which he received cordial welcome, being inhabited by tribes of the purest Mahomedan faith. Nufi is but an insignificant town, and is full of pagans, a circumstance which appeared to have given Mahomed great concern; it is situated on the left bank of the Niger, and further from its source than Boussa, where many coinciding reports agree, that our unfortunate countryman, Mungo Park, lost his life by shipwreck.*

* The following statement of a native of Yawoori, now residing in Sierra Leone, is given nearly in the manner in which it was related in my presence, October, 1821. "My name is Duncanoo, I was born at Brinée Yawoori, and was there about sixteen or seventeen years ago, when a ship with two masts made her appearance in the Joliba. As she seemed to be passing the town, and as the king was desi-

He asserts most positively, that the river runs due east from Boussa to Nufi, and inclines a little to the southward after leaving the latter town; circumstances which operate rather forcibly against the validity of Richard's old hypothesis, now newly brushed up, and become the favourite opinion of the day. To the northward and eastward of Nufi, the country is very mountainous and bold, and it is from thence that all the small rivers which he crossed in his journey from Kashana derive their origin; this high land is called Ksekseh. To the westward, between Houssa and Yawoori, is situated on the Niger, a town of immense magnitude and importance called Kuku, of the power of which the surrounding tribes stand much in awe.

In one day's march S. W. from Nufi, Misrah reached Yarraba, where he states that a singular trade is carried on, between the natives and a tribe of white people, said to be Christians, who come down a river which flows into the Niger from the southward, and exchange commodities without personal intercourse. Concerning this improbable, and (if true) almost unaccountable story, which is related by many native travellers, as well as the priest, and which occupies a page or two in the travels of almost every European who has ever ventured beyond the sight of the ocean into this forbidden country, I questioned Mohamed Misrah for some time before I learned that he himself had never seen either the white people in question, or their mode of

rous of knowing what people were in her, he sent off eight canoes (in one of which was a red bull, intended as a present) to inquire; but the people on board, some of whom were white, would not permit them to approach, and as they continued following, subsequently fired upon them, but did not kill any. The king of Yawoori was sorry they had mistaken his intentions, for being anxious on account of their safety, he wished to show them the right channel of the river, which near Boussa, becomes very rocky, and difficult to navigate. After the vessel had passed Yawoori, most of the inhabitants left the town, and went to Boussa (which is one day's journey by land, and thirty-six hours by water) to witness the disaster which they knew by experience would there occur. On their arrival at Boussa they perceived the ship coming down the stream with a rapidity which increased as she drew near to the fatal rocks and cataracts, till at last becoming quite unmanageable, the confusion on board was seen to be very great. When the vessel struck, she went to pieces so immediately, that they could only save one man, who was a black slave, and spoke the Foulah language; this black man was detained at Boussa, but no person was either landed or kept a prisoner at Yawoori.* Just as the vessel struck, one of the white men (supposed to be Park) seemingly much agitated, threw something into the water, and having followed it, soon disappeared; the rest shared the same fate, it being utterly impossible to contend against the impetuosity of the river at this place. The people at Boussa picked some guns and pistols out of the water, by means of diving with ropes fastened round their bodies, an exercise at which they are very expert. The river at Boussa is very broad, and admits of a safe passage through the rocks, with which the natives are well acquainted." About a year after this occurrence, while on a trading journey, Duncanoo was seized upon by the Foulahs, and carried to the Gold Coast, which occupied a journey of nearly two moons; he does not remember having crossed any high ground on the way, but he came a great part of the way by water. On his arrival at the coast, he was sold and shipped on board a Portuguese vessel, which conveyed him to Bahia, where he remained for three years, and was then put as a seaman on board a slaver, which was captured on the coast of Africa by Captain Mill in Governor Maxwell's time, and brought into Sierra Leone, where he was liberated.

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* This would appear to contradict Amadoo Fatima's statement, as given by Isaaco.

carrying on trade: and on my expressing surprise that curiosity did not induce him to witness a scene so singular, he observed with much indifference, that as the people of the one country were pagans, and those of the other were Christians, he, as a Mahomedan, was not very anxious to hold communication with either. When a story is once promulgated in Africa, it is never lost sight of; on the contrary it becomes established more firmly by age, and the perfectly fictitious, improbable and absurd, is actually believed by the very inhabitants of the place, where the circumstance is said to exist; indeed, such is the power of this extraordinary credulity, that they will be highly offended with any one, who may attempt to convince them of its fallacy; repeated instances of this nature, though of minor import, have been experienced by myself during some short excursions among the Timmanees and Mandingoes, in particular once at Cambia, on the Kolenti Ba (Scarcies) when having broken a specimen of granite from a large block in the centre of the river, I endeavoured, at the Palaver, which the natives called in consequence, to explain to them how absurd it was to suppose the existence of any evil spirit in a rock; upon this occasion their anger was so stirred up, that I found it a difficult matter to change the subject, and bring them back to good humour. The specimen in question was not procured without considerable difficulty, for even the men whom I had with me from Sierra Leone, refused to row me to the spot.

To return to the priest; in five days after leaving Yarraba, he reached Azzugo, situated in a country flat, sandy and barren; he then proceeded W. by S. to Goingia, a journey of ten days, through a barren country, to the southward of which lies Dahomy, a very bad country, where he understands people eat one another; four days west through beautiful and well cultivated regions, abounding with every description of provisions brought him to Degumba, to the left of which are to be descried lofty mountains, extending along the horizon as far as the eye can reach; these are of course the mountains of Kong, which were formerly supposed to stretch across the whole breadth of Africa; along the road to Degumba, numbers of women are to be met with inhabiting booths, in which the traveller may repose, and be regaled with milk, fruit, and other refreshments, in exchange for kolas and kowries; the former, a fruit, so much prized by all Africans, grows abundantly here, and is the means of attracting the surrounding nations, who flock in great bodies to Degumba for the purpose of procuring it in exchange for European and African produce. Gourma is the next place at which our priest arrived, having travelled in a direction a little to the southward of east, passing through many small towns and villages, and a country rather fertile than otherwise; three days more, pursuing the same course, brought him to Mousi, a country which produces almost every article of food required by the African, excepting kolas, to get which they are obliged to trade to Degumba; and although the distance is so trifling, yet such is the estimation in which that article is held, that six or seven are said to be a handsome price for a fine Mousi horse: this noble animal is very plentiful in this part of Africa, and arrives at great perfection, growing larger and stronger than at any other place which the priest has visited. The principal vegetable productions of Mousi, as well as of those countries which he passed through after crossing

the Niger at Nufi, are yams, rice, and corn, the latter of which grows luxuriantly in most of the interior regions: the natives of those districts are a mixture of converts and pagans, but Mahomed regrets that while the proportion is materially in favour of Paganism, the Mahomedans are not very firm in their faith. From Mousi, turning towards the north-west, and passing through various small towns and villages, about a day's journey from one another, he arrived at Jenne, or Janne, in fifteen days, but did not fall in with any river running to the northward; therefore we must still allow Park to be correct in laying down the land of Jimbala as an island formed by the separation of the waters of the Niger. This place, though not as yet visited by any white person, is known to us as a large, important, and well-built town; it is situated at the termination of a creek, which encroaches on the right bank of the Niger, is a great mart for the exchange of all kinds of African produce and European manufacture, has a regular market-place, and is much frequented by the Moors, who resort to it in large parties with loaded camels. Janne is not, however, an independency, being much under Moorish control, who, it is said, appoint and dismiss at pleasure a governor, or dharaboo, who, during his administration, has as much authority as any independent chief. Timbuctoo is governed in like manner, its superintendent being appointed by Muley Ismahel, the great Arab prince, of whom mention has been made in a former part of this journal. The present governor is named El Hreidé Baka, but is not a Moor. The latter part of this information was not obtained from the priest, but from various native travellers, whose statements fully corroborated each other; I shall only particularize Setafa, the messenger to Sierra Leone from Dalhaba, king of Sego; and Marmadé Jumé, a great itinerant, who came from the Mousi country only eighteen months ago; the latter in his answers to many questions which I put to him, agreed, in many instances, with the accounts given by the sailor Adams, but he never heard of a headman named Woolloo, who, according to Adams, was king when he was residing there; he has often met traders from Houssa, carrying salt, or congwa, to Timbuctoo. Congwa is used for many purposes; it is mixed with their food, is taken as a medicine, and is sometimes pounded and put into snuff; it has a bitter taste, and I should suppose is more like alum than salt. From the scarcity of this useful article the natives are often compelled to use as a substitute the ash procured by burning branches of the pullom, or cotton-tree. Setafa was at Janne about a year ago, and staid two moons; he relates the following curious circumstance regarding the purchase and payment of articles there, which, if correct, will show that credit is given to no great extent in Janné. In the centre of the town there is a large market place, where all merchandise and produce is, and must be, exposed to sale, any article disposed of otherwise being liable to confiscation; should any individual purchase goods from another, and be permitted by the seller to walk away without paying for them, he can never be seized upon for the debt, unless again found in the market-place.

In seven days from Janné, pursuing a south-westerly course, Mahomed Misrah reached Sego, the capital of the kingdom of Bambarrana, at which town I shall leave him to prosecute the remainder of his journey by himself, as this part of the country is already well

known to us, through the medium of European travellers, and as it is to be presumed, that, before this time, an account, more circumstantial than any that has hitherto appeared, may have issued from the pen of Staff-surgeon Dochard, who passed several years in the interior, and a considerable length of time on the banks of the Niger; I nevertheless think it necessary to observe, that I have in my possession the route of the priest, as well as of many other natives, from Sego to the coast, and that although I am perfectly satisfied, from the agreement of the statements with other accounts, that the whole of Mahomed's information, as far as regards his own personal observation, may be relied on, yet I do not perceive any thing of sufficient consequence in the remainder to interest those who have already perused the travels of Mungo Park, Mollien, and others.

I put many questions to the priest, respecting matters on which I was already well informed, to ascertain what degree of credit I might be authorized in attaching to his narrative; and I had much gratification in finding that the result proved to me that he was not only a man of strict veracity, but of intelligence, acuteness, and extraordinary correctness in his observations, for I frequently endeavoured, in the course of my several conversations, to confuse him, by altering the nature of the questions, but I generally found that his answers led to one conclusion only. After my first interview with him, I drew a map of his route from Pendy's large map of four feet square, and coloured it, to mark more distinctly the limits of the countries; at a second, I produced the map, which (as he understood it perfectly) enabled me to go over his journey with more precision than before. He made several remarks on it, observing that the windings of the Nile were too numerous in Dongola; that Dar Bergoo was too confined, it being more than double the breadth from east to west; that the capital town of Bomors should be placed farther to the southward; that the river which falls into the lake Fitri takes its rise more to the northward and eastward; and that Kashara is a more considerable country than the map delineates.

The priest supposes his day's journey might average about twenty miles, the whole giving a distance of 2720 miles, from Misrah to Sego, and as we know that Sego is about 700 miles distant from the colony of Sierra Leone, the whole extent of his journey may aggregate about 3620 miles, from which, if we deduct 400 miles completed for the deviation of the courses which he has himself given from the straight course between Misrah and Sego, 3020 miles will be left for the journey, had it been possible to perform it in a direct line; this at once exhibits a very extraordinary and satisfactory coincidence, for it will be found to differ but little from the straight measurement on the map, which is about 2925 miles. The attention is here naturally arrested to admire the accuracy and astonishing capacity of this priest; for had he travelled with an intention of marking his route, and been furnished with suitable instruments for the purpose, at the same time having a knowledge of the use of them, he could hardly have accounted for his ground more correctly, which is a very desirable fact to be certain of, as it enables us in conjunction with other circumstances already detailed, to attach a considerable share of importance to his information respecting the Niger. He appears to be quite positive that the

Nile is a continuation of the Niger, and that Baher el Abeed is the link of connexion, for he has met people who have told him that they travelled along its banks, from Nufi to Sennaar; that it is very broad, and frequently overflows its banks, inundating the country to an immense extent. But while I attach little or no credit to what he has *heard* (being well aware that the native travellers too often consider themselves privileged to deal in the marvellous), yet I think, presuming the height which would be required for the source of the Niger not to be an objection, the only other is its great breadth at an early stage of its course, and the consequent magnitude which it would necessarily attain from tributary assistance, previous to falling in with the range of the Nile. But although a little very simple reasoning might in a measure cancel the latter objection, yet where there does exist one, let it be ever so trifling, the hypothesis cannot be allowed to be valid. It may be argued, for instance, that Mr. Park saw the Niger at Sego as broad as the Thames at Westminster, and many natives have assured me that, during the rains, it swells to such a size that the explosion from a musket cannot be heard on the opposite shore; towards Boussa, where Park lost his life, the river spreads out still wider, forming many considerable islands, but as it flows past Nufi, where the country is bold and mountainous, it becomes compressed within limits of about 400 yards; therefore, as the breadth of the Niger, nearly a thousand miles from its source, is only four hundred yards; and as the greater portion of the country through which it shapes its course is low and sandy, a cause to which it is indebted principally for its amazing breadth, we may infer that the river is by no means of that magnitudinal importance which we have been led to suppose, and that the Niger may join the Nile, without making the latter a greater river than we have it already described by travellers. Mr. Bruce says, that the country about Sennaar, though flat, is nearly two miles above the level of the sea; from which, and from the northerly course of the Nile from that point, it must be clear that the slope of the land is towards the Mediterranean, and that if the Niger makes its way so far to the eastward, it must discharge itself into that sea, through the channel of the many-mouthed Nile. On the other hand, many natives from Houssa, who have been made prisoners by the Foulahs, and been brought overland to the Gold Coast, have affirmed that they crossed no mountains by the way, showing that there is no barrier against the Joliba, or any other river flowing in that direction, but certainly not proving that it does; indeed, the easterly course of the Niger at Nufi, which has already been taken notice of, must in a great measure set that matter at rest; and if afterwards the Niger, from intervening high ground, is found to abandon its course eastward, and adopt a southerly one, the mouth of the Congo may be its outlet. How curious indeed, and how honourable to the memory of the immortal Park, should future research prove this to be the case.

It may not be out of place before I conclude, briefly to suggest a plan which appears to me more feasible than any that has as yet been proposed, for exploring the course and throwing light on the termination of the Niger. Some have recommended the hazardous undertaking of accompanying a caravan from the north of Africa, as the most likely means of ensuring success, while others have considered

an attempt by way of the Senegal and Congo rivers more prudent, as well as more practicable; but as yet every trial has proved abortive, and it therefore behoves us to make our advances in a different manner.

The intercourse between the nations in the interior and the colony of Sierra Leone has of late years become very great, and, to a common observer residing in the colony, it must appear evident that the intercourse is daily increasing; indeed, to such an extent is good faith now established, that little excursions, in the shape of parties of pleasure, are frequently made by the inhabitants among the neighbouring tribes.

Allowing that it is reasonable to expect, from the hitherto gradual enlargement of connexion, that the good understanding will be extended still farther by the just and equitable dealings of the merchants, as well as the liberal and philanthropic nature of this establishment, it can scarcely be considered a rash undertaking to set out as a travelling merchant from Sierra Leone, and keeping to the southward of Foulah Jalcon, reach Saukara, where there is little doubt that the English will be well known shortly; from Saukara a north-easterly direction ought to be pursued, to fall in with the Niger at Nufi, from whence its further course might be traced.

That this is the best route for arriving at such determination appears from the following consideration; the river will be reached much sooner, and with less hazard than if approached from the northward; and a short journey along its banks from Nufi might be expected to determine whether its course is bent to the south, or whether it firmly persists in its eastward direction.

It is adviseable that this attempt should be made by a single traveller; and I trust, from the spirit of enterprise which has arisen in Sierra Leone, that the day is at no great distance when it will be undertaken with success. I am, Sir, &c.,

AN OFFICER IN THE ARMY SERVING IN SIERRA LEONE.

Fort Thornton, April 10, 1821.

NOTES.

The town of Houssa is distant as far from the Niger, which is there called Lessee, as Port Logo is from Sierra Leone, or about sixty miles. It stands upon nearly a square mile of ground, is walled round, and has seventeen entrances or gates; the walls are about twenty-five feet in height, four feet in thickness, are very strong, though built of mud, and are defensible from the top, there being a path round the whole, about six feet from the summit. The houses are of a circular form, and are thatched with grass, after the manner of those on the west coast of Africa; some of the streets are straight, and some winding. By digging two or three feet in the sand outside of Houssa, *water can always be procured*, but mud is no where to be met with in that country. The congwa is procured in Bornou, during the dries, from a place where water lodges to the depth of about nine inches in the rainy season; it is like fine flour, and lies from twelve to fifteen inches thick along the ground, from whence it exudes so profusely, that if a space of 200 yards is cleared in the afternoon, next morning at the spot as much may be gathered as will fill ten baskets. There is also a sort of red congwa, which is dug out of the

ground in lumps, and tastes exactly like the white. It is bought in Bornou for fifty cowries an ass load, and sold in Goingia for 3,000.

[Collected from Serjeant Frazier, 2d West India regiment, who was born in Houssa, and resided there for a long time, was taken prisoner in Goingia, and brought to the Gold Coast, where he was sold.]

FROM THE LONDON MAGAZINE.

FERDINAND MENDEZ PINTO.

Ferdinand Mendez Pinto was but a type of thee, thou liar of the first magnitude.
Love for Love.

Most of our book collectors are familiar with—*The Voyage and Travaile of Sir John Maundevile, Knight, which treateth of the way to Hierusalem, and marvayles of Inde;* and it is well known that this bold seeker, and fearless assertor, of incredible adventures, left England in 1322; visited Tartary about half a century after Marco Polo; religiously declined marrying the Soldam of Egypt's daughter, because he would not renounce Christianity; and after wandering for thirty-four years through the realms of Inde, and being long reputed dead, returned to publish his adventures, scrupulously qualifying his most astounding relations with some such words as these:—*thei seyne*, or *men seyn, but I have not sene it.* The original English MS. is in the Cotton Library, but the reader, on referring to the Tatler, No. 254, will be amused with Addison's pretended discovery of these writings, and the pleasant fiction of "the freezing and thawing of several short speeches, which Sir John made in the territories of Nova Zembla."

Although the name of Ferdinand Mendez Pinto, the Mandeville of Portugal, has passed into a bye-word in England, being commonly used as a paraphrase for mendacity, little or nothing is known of his history or travels; and as his strange work is not now of common occurrence, I propose to translate, for the benefit of your readers, such occasional passages as most amusingly illustrate his circumstantial exaggerations, all of which he narrates as an eye-witness; and thus at the same time exemplify the credulity of an age which was content to receive such marvels as authentic records. His first chapter is a short biographical sketch of his life, before embarking for India, probably the most veracious portion of the whole narrative, and I shall therefore give it as nearly as possible in his own words, using only the privilege of abridgment.—"Whenever I reflect on my continual struggles, troubles, and anxiety, since my very infancy, I feel great reason to reproach Fortune, as if her glory were only founded upon her cruelty: but when I call to mind my manifold perils and trials in the Indes—that it has pleased God to relieve me from the persecution of the blind Fury—to preserve my life, and place me safe in port, where I may leave to my children, for memorial and inheritance, this rude and imperfect work, I feel how grateful I ought to be to the Giver of all mercies. I write for my children, that they may know the wonderful hazards I encountered in twenty-one years, having been thirteen times captive, and seventeen times sold to the Indians and savages of Ethiopia, Arabia Felix, China, Tartary, Madagascar, Sumatra, and many other kingdoms and states of that oriental Archipelago, at the

extremity of Asia, which the Chinese, Siamese, Gueos, and Luquinese, justly term the eyelids of the world, and of which I shall hereafter more fully treat; whereby they may learn what is to be effected by courage, fortitude, and perseverance, in every pinch and extremity of Fate. Thanking God, therefore, for his singular favours, and owning all my sufferings to be the consequences of my sins, I take for the beginning of my work the time that I passed in Portugal, where I lived till I was ten or twelve years old, in the misery and poverty of my father's house, in the town of Monte Mor Ouelho; when an uncle, desirous of promoting my fortune, and withdrawing me from the blind indulgence of my mother, carried me to Lisbon, and placed me in the service of an illustrious and wealthy lady. This happened on St. Lucy's day, the 13th of December, 1521, the same on which they celebrated the funeral ceremony of our late king, Don Emanuel, of happy memory, which is the very earliest thing I can recollect.—After having been one year and a half in the service of this lady, an affair occurred which placed my life in instant jeopardy; so that to escape from death I left her house in all haste, being so bewildered, and overcome with terror, that I knew not whither I fled, until I arrived at the Port de Pedra, and beheld a galley loading with horses for Setuval, where the king Don John the Third, whom God absolve, then held his court, on account of the great plague with which many parts of his kingdom were infested. Embarking in this galley, I sailed the next day; but, alas! no sooner were we fairly out at sea than we were attacked by a French corsair, who, unexpectedly boarding us with fifteen or twenty men, carried our vessel. After having stripped and pillaged us, they took out our cargo, with 6000 ducats, and then scuttled and sunk the galley, so that out of our crew of seventeen not one escaped slavery. As they were freighted with arms for the Mahometans, they bound us hand and foot, intending to sell us for slaves in Barbary; but at the end of thirteen days it pleased Fortune that, about sunset, they discovered a ship, to which they gave chase all night, following in her track, like old corsairs accustomed to such brigandage, and running along side towards daybreak, they fired three guns and boarded her, killing six Portuguese and ten or twelve slaves.

"It proved to be a large and goodly vessel belonging to a Portuguese merchant, called Sylvestre Godinho, coming from St Thomas's, with a great quantity of sugar and slaves, worth 40,000 ducats; so that having now such a rich booty, the corsairs abandoned their plan of going to Barbary, and set sail for the coast of France, taking with them as slaves such of our crew as were capable of assisting them in their navigation. As for me, and the others who remained, they landed us by night at a place called Melides, where we remained all miserably naked, and covered with wounds from the blows and lashes we had received. In this pitiable state we arrived next morning at St. James de Cacen, and here our sufferings were relieved, principally by a lady named Donna Beatrix, daughter of Count Villanova; when, after being cured of our wounds, we all betook ourselves whithersoever we thought we might best mend our fortunes. For my part, poor as I was, I wandered with six or seven companions in misery to Setuval, where good fortune instantly placed me in the service of Francisco de Faria, a gentleman in the household of the grand commander of St. James, who, in reward of four years' service, gave me to the aforesaid

commander, to act as chamberlain, which I did for eighteen months. But as the wages then paid were insufficient for my support, necessity compelled me to quit him, though I availed myself of his influence to obtain permission for embarking to the Indies, being resolved to try my fortune in the East, and submit to whatever good or ill fate might be reserved for me in those unknown and remote countries."

On the 11th of March, 1537, our traveller set sail with a fleet of five ships, and arrived safely at Mozambique, whence they were ordered by the governor to proceed to Diu, as he was in daily expectation of the armies of the Grand Turk, to avenge the loss of Sultan Bandar, King of Cambay, whom the said governor had put to death the year before.—On their passage from Diu to the Straits of Mecca, they were audaciously attacked by a pirate of inferior force, upon whom, however, they retaliated with such destructive effect, that all the crew, consisting of eighty, were killed or drowned, with the exception of five, whom they made prisoners. One of these was the captain, who, upon being put to the torture, confessed that he was a renegado Christian, having been born at Cedenha, but that becoming enamoured of a beautiful Greek Mahometan, he had renounced Christianity and married her. Earnest and friendly proposals were made to him to abandon his errors, and resume the Catholic faith; all which he resisted with the most unshaken obstinacy and resolution. "Whereupon," says our traveller, "the captain infallibly concluding that this abandoned miscreant was not to be won from his blindness and heresy, in not believing the thrice holy Catholic faith, became suddenly inspired with such a lively zeal and vehement love of God, that he tied him neck and heels, and having attached a large stone to his neck, cast him into the sea, where the wretch now shares the torments of his Mahomet, and keeps him company in the other world, for having been his disciple in this."

Giving this extract as a short specimen of the more authentic, or, at least, the more credible portion of his narrative, I shall cite a few equally brief passages, illustrative of those marvellous statements, and stupendous assertions, which have occasioned the name of Ferdinand Mendez Pinto to be generally mentioned with the complimentary cognomen of "the Liar."

It will hardly be expected that any summary or analysis of his book should be attempted, when the reader is informed, that it consists of 229 closely printed chapters, into which we shall therefore only dip hap-hazard, as if consulting the Virgilian lots, and leave the result to declare its own auguries. And here it is at least consolatory, that we are never deluded by hearsay, nor fobbed off, as in the case of Sir John Maundevile, with—"thei seyne—or men seyne, but I have not sene it;" for honest Pinto is very properly scrupulous upon these points, and scorns to be satisfied with any thing less than ocular demonstration. It is true, that both himself and the captain of the vessel, Antonio de Faria, did occasionally entertain very grave doubts as to the marvellous averments of their Chinese pilot, Similau, who disdained any other reply to their injurious suspicions than forthwith to carry his vessel into the very thick and centre of the wonders he had described, and submit them to the evidence of their seven senses. Opening the ponderous tome at a venture, we seem to be poaching upon the manor of Bishop Pontoppidan, expecting with every line to catch

a kraken, such is the abundance of large fishes and other sea-game with which we are instantly environed. Even our traveller, accustomed as he was to portentous spectacles, acknowledges that he was somewhat startled at the sight. "We arrived at length at a port called Buxiphalem, in the 49th degree north, where we saw an infinity of fishes and serpents, of such strange forms, that I can hardly describe them without terror. In this place we beheld some in the form of ray fish, which we called *Peixes Mantas*, above four fathoms in circumference, with a muzzle like an ox; others like enormous lizards, spotted black and green, having three rows of bristles on the back, extremely sharp, and as thick as an arrow, with others all over the body, though not so thick. These fish occasionally bristle up like porcupines, which renders them very dreadful to behold. They have a very black and pointed snout, with sharp teeth, a foot and a half long, issuing from the jaws, like the tusks of a wild boar, which the Chinese call *Puchissuchoens*. Here also we saw another sort, having the whole body extremely black, like the fish we call the Miller's Thumb, but so prodigiously large, that the head alone is six paces across, and when they extend their fins in the water they appear a fathom broad. I shall pass over in silence the innumerable other species we saw, as being foreign to my subject—suffice it to say, that during the two nights we passed in this spot we never thought ourselves in safety, on account of the lizards, whales, fish, and serpents by which we were surrounded; especially as we heard such a constant hissing, flapping, and neighing of sea-horses, which abound in these parts, that words cannot describe the uproar."—Chap. 71.

In the very next chapter we encounter a race of giants, whom subsequent travellers thought proper to transplant to Patagonia, whence, however, they have been ejected by more accurate navigators; and these lofty specimens of humanity threaten to become extinct, unless revived by some voyager not less *splendidè mendax* than the subject of our article.—In the absence of the American sea-serpent, and the mermaid discovered in the Hebrides, of which a circumstantial account generally runs through the papers every two or three years, we may put forward the following narrative, which it is not improbable suggested to Swift the first idea of the Brobdingnaggians.

"Continuing our voyage, both by rowing and sailing, and turning our prow according to the serpentine course of the river, we arrived next morning before a very high mountain called *Botinafau*, whence ran many rivers of fresh water. In this mountain there was a quantity of tigers, rhinoceroses, lions, ounces, and other wild beasts, which, leaping and crying, by reason of their natural ferocity, made a cruel war upon the weaker animals, such as stags, wild-boars, monkeys, baboons, apes, wolves, and foxes, which we contemplated for a long time with wonderful pleasure, occasionally shouting all at once to frighten them, whereat they were a little alarmed, not being accustomed to the pursuit of hunters. On leaving this mountain we encountered another, not less wild and savage, called *Gangitanou*, beyond which all the country is very rugged, and almost inaccessible. Similau informed us, that certain men, called *Gigauhos*, dwelt at the foot of this place, who were of enormous size, living like brutes upon the spoils of the chase, or upon the rice which the Chinese merchants brought them from Catan, and bartered with them for furs. He as-

sured us that more than 200,000 skins were annually exported, which the Chinese consumed for the lining of winter robes, carpeting, and counterpanes. Antonio de Faria, much astonished at this, but still more at the stature of these *Gigauhos*, begged the pilot to procure him the sight of one, assuring him, that it would be more gratifying to him than to possess all the treasures of China; to which Similau replied,—'Signor Captain, as I see that this is essential, both to preserve my credit with you, and to impose silence upon those who murmur and make mockery of me when I relate things which they consider so many fables; in order that by one truth they may judge of another, I swear to you, that before sunset you shall see a couple of these people, and speak to them, on condition that you do not go ashore as you have hitherto done, for fear any misfortune should happen; for I assure you that these *Gigauhos* are naturally so brutal and fierce, that they live upon flesh and blood like the beasts of the forest.' Among the thick trees and wild mountains that enclosed us as we advanced, there was such an infinite number of apes, monkeys, foxes, wolves, stags, wild boars, and similar animals, that they encumbered and impeded one another, making such a loud noise that we could not hear ourselves speak, which amused us for some time; until, upon turning a point of land, we saw a young boy, without any beard, driving before him six or seven cows which had been pasturing thereabout. Similau having made signs to him he immediately stopped, and when we had gained the bank where he was, Similau showed him a piece of green taffeta, whereof these savages are immoderately fond. Upon asking him by signs whether he would buy it, he replied with a voice very much broken, *Quiteu—parau—fau, fau*—words which we could not understand. Antonio de Faria, then commanded that three or four yards of this taffeta should be given to him, as well as six pieces of china, which the savage having taken, one after another, he appeared transported with joy, and cried out—*Pur pacam pochy pilaca hunangue doreu*, which we could no more comprehend than the preceding. Leaving his cows by the river, he then ran off into the woods, being clothed in the skin of a tiger, his feet and arms naked, his head uncovered, and having no other weapon than a stick burnt at the end. As to his height, by what we could guess, it was above seven feet and a half; but we were much astonished when, in a quarter of an hour after, he returned, bearing upon his shoulders a live stag, and accompanied by thirteen people, eight men and five women, who led with them three cows, and danced together to the sound of a drum, on which, from time to time, they struck five times, then clapped their hands, and cried, *Cur cur hinau falem.* All these people, both male and female, were clothed exactly alike, except that the women wore large tin bracelets, on the middle of their arms, and had much longer hair than the men, which they decorated with flowers. They had also round their necks chains of red shells, as large as oyster-shells. All of them had a very savage look, with thick lips, flat noses, large nostrils, and the rest of the body enormous, though not so much so as we had imagined; for Antonio de Faria, having caused them to be measured, found that the tallest did not exceed eight feet in height, excepting an old man, who was nearly six inches more. As to the women they were hardly seven and a half feet high; and to judge by their looks, I should deem them very coarse and gross, and less rea-

sonable than any people we have ever encountered. Antonio de Faria highly gratified that we had not come there for nothing, gave them sixty pieces of china, a piece of green taffeta, and a basket full of pepper, whereat they were so delighted, that throwing themselves upon the ground, and lifting their hands to heaven, they all said at once, *Vumguahilen opum-guapau lapaon, lapaon, lapaon,* which we took for expressions of gratitude, and thanks."—Chap. 72.

Our next dip into this marvellous tome conveys us to the city of Pekin, in China, which he introduces to us with a candid and ingenuous profession of his own simplicity and truth, that ought to disarm criticism, and procure him implicit credence from all those who are not incurably sceptical, or needlessly disposed to cavil at the following relation, made, it must be remembered, by an eye-witness.

"As my design in writing this book is solely to bequeath it to my children, as an alphabet wherein they may trace my labours and travels, I care little about the form and style of its composition; for it appears to me much better to leave these things to nature, and simply to describe matters as I saw them, without amusing myself with hyperboles or circumlocutions. I shall therefore proceed to state, that the city of Pekin is situated forty-one degrees north; being, according to some, thirty, and according to others, fifty leagues in circumference, but the latter estimate includes the suburbs. On the inside the walls are lined with fine porcelain, and decorated with painted lions and gilt banners. It contains five hundred palaces, called houses of the Son of the Sun, where are maintained all those soldiers who have been wounded in the king's service, generally amounting to about a hundred thousand in number. We saw a very long street, with low houses, where resided twenty-four thousand watermen, the king's rowers; and another of the same construction a full league long, where there were fourteen thousand cooks belonging to the court; and a third of similar form, where we beheld an infinity of women of the town, who are exempted from the tribute paid by the regular courtesans. In this quarter also dwell all the washerwomen, amounting, as we were told, to more than a hundred thousand; and, in the same enclosure, are thirteen hundred noble and sumptuous houses, some of them containing a thousand people, for the religious of both sexes. We saw also a good number of houses having large gardens attached to them, and even thick woods, stocked with game and deer of all sorts." Chap. 104.——In fact, the wonders they saw were so manifold and bewildering, that the poor man says it would be impossible to enumerate them at that time, although he would certainly resume the subject, and give a more detailed account upon some future occasion; a pledge which he shortly after redeems with the following touching expression of his regret that he should have committed himself to so difficult a task.

"This city of Pekin, of which I have promised to speak more fully, is so prodigious, and the sights to be seen therein so remarkable, that I almost repent my undertaking, which, to say the truth, I hardly know how to set about; for we are not to suppose that it is such a city as Rome, Constantinople, Venice, Paris, London, Seville, or Lisbon; nor that any European city, however populous or famous, can be compared with it. Neither can any of the celebrated palaces beyond the confines of Europe pretend to rival it in its stupendous buildings,

excessive riches, wonderful abundance, innumerable population, its great commerce, and infinite vessels; its courts of peace, justice, government, and other institutions. By the chronicles of the king of China, it appears that this city is thirty leagues in circumference, without reckoning the suburbs, in which latter are many astonishing things, whereon I might enlarge if I thought proper. It is enclosed with a double wall of hewn stone, of great thickness, with three hundred and sixty gates, each having a barbican of two very high towers, surrounded by ditches, over which there is a drawbridge. At each gate is an officer, with four halberdiers, who are obliged to give an account of every thing that enters or passes out. Within these walls are three thousand eight hundred pagodas or temples, where are continually sacrificed a great number of birds and beasts, all wild, which they hold to be a more acceptable offering than the tame ones, according to the assertion of their priests, who thus pass upon them a great abuse for an article of faith. This city has moreover twelve hundred canals, made by the kings and people of former days, which are three fathoms deep and twelve broad, traversing the streets in every direction, over which are bridges built upon arcades, with columns at each end, and benches for the passengers. Four fairs every day are held in the different quarters, where we saw an immense abundance of silks, brocades, cloth of gold, linen and cotton goods, skins of martens and ermines, musk, aloes, fine porcelain, gold and silver plate, pearls, gold in ingots and dust, and such like articles, whereat we were all much astonished. I should want words were I to attempt a description of the quantities of the other things, such as metals of all sorts, coral, cornelian, crystal, quick-silver, vermilion, ivory, cloves, nutmegs, mace, ginger, tamarisks, cinnamon, pepper, cardamoms, borax, flower of honey, sandal, sugar, fruits, conserves, venison, fish, flesh, and fowl, as well as fruits and vegetables of every variety. There are one hundred and sixty meat markets, not only provided with the customary flesh, but with that of horses, buffaloes, the rhinoceros, tigers, lions, dogs, mules, asses, chamois, otters, and zebras, every sort being eaten in this country. There are also immense cellars filled with hams, smoked meats, pigs, boars, and birds of every description; all which I only record to show how liberally God has supplied the wants of these poor blind infidels, in order that his name may be glorified forever." Chap. 106. S.

FROM THE MONTHLY REVIEW.

Rapport sur l'Origine, &c.; *i. e.* A Report on the Origin, Progress, Propagation by means of Contagion, and Cessation, of the Yellow Fever which prevailed at Barcelona in 18[illegible]; presented on the 14th of March, 1822, to the Superior Polit[illegible] Chief of Catalonia, in compliance with the Decree of the Special Cortes, by the National Academy of Medicine of Barcelona. Translated from the Spanish, by PETER RAYER, Physician attached to the Fourth Dispensary of the Philanthropical Society, &c. 8vo. pp. 99. Paris. 1822. Imported by Treuttel and Co. Price 3*s*.

THIS Report on the Yellow Fever of Barcelona is drawn up by eight members of the Academy of Medicine of that city, and its tendency

is to support and explain the views of those who regard the disease as both contagious and of foreign origin: but the writers, with perfect candour, prefix a summary of the opinions held with regard to it by each of the fourteen members of the Academy. It is sufficiently remarkable that, of the eight physicians who subscribe the Report, and who unite in believing the disease to have been imported, only one declares it to be *essentially* and *uniformly* contagious;—one other pronounces it to be *essentially* contagious, when the localities are favourable, as in Barcelona in 1821;—and the remaining six state their belief that it was contagious in the city, but did not manifest this character in persons who had retired into the country, or who died there. Four of the members join in the opinion that the disease was of indigenous production, and not contagious;—one expresses his ignorance as to the source of the disease, but coincides in regarding it as not contagious;—while another asserts that the fever may have been either imported or indigenous, but was not contagious; and that, if it even exhibited that character, it was merely an accidental circumstance, and by no means essential to its nature.

Under these circumstances of discrepancy of opinion, it was the duty of the public authorities, while they adopted any measure of precaution which a just dread of infection clearly required of them, to beware of being hurried by their fears into a harsh and unrelenting system of restrictions, such as are adopted during the known existence of the plague. Measures of this kind demand a rare union of firmness, judgment, and humanity, in carrying them into effect; since otherwise we are in danger of adding extreme distress and even famine to the horrors of disease, and thus aggravating instead of relieving the general calamity. Let us now proceed to trace the history of the fever of Barcelona, and of the means employed for its suppression: in order that we may be enabled to form some estimate of the accuracy of the opinion held by the authors of the Report concerning its contagious nature; and of the wisdom which dictated the employment of severe coercive measures, aided by a military force, in attempting to subdue this apparently irresistible enemy.

In the months of June and July, 1821, several vessels entered the harbour of Barcelona from the Havanna, some of which had lost during the passage as many as twenty of their crew; and the authors of the Report state that they have before them documents, proving the existence of yellow fever in the Havanna when these vessels sailed. Soon after their arrival at Barcelona, cases of disease occurred on board, which caused alarm in the minds of the medical men who saw them. The symptoms are not described, but we are left to understand that they were those of yellow fever. One of the sailors was landed sick, and died of the disease, but, which is remarkable, without communicating it to any other person. Insulated cases of the malady also occurred at Canet, and Malgrat, without spreading the infection; in consequence, it is added, of the precautions adopted by the authorities: but no attempt is made to trace these latter cases to any intercourse with the ships in the harbour. Still this malady spared Barcelona and its suburbs, which seemed so immediately exposed to its baleful influence: but the calamity was only delayed, to fall on their devoted inhabitants with more desolating fury. An individual of Tortosa, who had communicated with the Havanna ships at Barcelona, embarked

for his home early in August, was taken ill at sea, and died a few hours after he reached his family. The malady is not described, but we are informed that it was communicated to his confessor, to the proprietor of the house, to those who had attended him, and to his visiters. From Tortosa, where the disease now raged with violence, it was conveyed to Asco by a domestic of that town. A statement is also given of the mode in which it was carried by sea to Mequinenza, in the end of August; and of the manner in which it spread through the house of the individual who conveyed it thither. Of nine persons composing the family, seven were attacked, and died.

Several inhabitants of Barcelonetta, trading in the harbour, and with the Havanna vessels, now became ill; and the authorities were so much alarmed, that they established a Lazaretto for the reception of the sick and suspected persons from on board of the vessels. Almost all who were received into it died with symptoms strikingly similar: but it is very deserving of notice that none of the attendants in this hospital were affected with the disease. At this time, but few cases of the fever existed in Barcelonetta, and the government wished to insulate the houses into which it had entered: but the unwillingness of the inhabitants to submit to such restrictions, and the difference of opinion respecting the contagious nature of the malady, prevented these measures from being carried into effect. A few cases of fever now occurred in Barcelona itself; and, as the reporters state, in a quarter of the town from which they are convinced that several individuals had been on board of the Havanna ships, while others of them had visited Barcelonetta. The neighbourhood of the Exchange appears to have suffered earliest from the fever, and thence it is stated to have spread to other quarters of the town.

A saddler, who had gone to fish in the Cuadro, and who went on board one of the Havanna ships, immediately on his return home felt unwell, and died (we are not told after what period) with the black vomit. The persons who visited him all died, and nine individuals who had come into the house. Other instances of a similar character are given; and, as a lesson to all non-contagionists, we are told the story of a captain who had lost by this disease the lady whom he loved; who denied all danger of infection, and embraced the lifeless body of his mistress again and again: but that same night, at bed-time, he was seized with a feeling of intense cold, head-ache, nausea, and pain in the stomach, and died on the third day, with the black vomit. We have here no hesitation in dissenting from the opinion of the authors of the Report, and expressing our conviction that the seeds of the disease had already been deposited in his frame, before this scene took place.

On the 15th of August, the Superior Board of Health of Catalonia addressed to the Political Chief a report on the symptoms and a state of the disease in Barcelona; with the means to be employed for its cure and suppression. The symptoms detailed are prostration of strength, depression of spirits, disgust, alteration of the physiognomy, great irritability at the upper orifice of the stomach, and in some cases so great a sensibility to pressure over that organ, as to render all examination of it by the hand quite insupportable. To these are added wandering pains, pulse rather flagging than accelerated, general torpor of the senses, yellow colour of the skin, turgescence of the conjunctiva, red

and dry tongue, bitter vomiting, bilious and sometimes bloody discharges from the bowels, and at last hæmorrhage from the nose and mouth. The disease is stated by the Board to be of foreign origin, and to arise from imported miasmata; although they admit that the action of such miasmata is favoured by the constitution of the atmosphere, the excessive heat of the weather, the foul state of the harbour, the filth discharged into it from the city, and the neglect of cleanliness on board of the vessels in the port. The extraordinary phænomena connected with the propagation of yellow fever induce them to hope, that their district is one in which it will not spread; and they strengthen themselves in this opinion, by observing, that the patients in the Lazaretto had not communicated the disease to any of the persons who approached them, on their way to that hospital, or to any of their attendants.

Of the treatment recommended by this Board of physicians, it may be almost sufficient to say that it is *stimulant* and sometimes *expectant*. Bark, wine, and opium, stand highest in favour. General blood-letting is wholly condemned: but one or two leaches are allowed to be applied, in cases of local inflammation. Emetics are proscribed, excepting a small dose of ipecacuanha at the commencement of the disease; and purgatives of the mildest kind, such as cream of tartar, or the pulps of tamarinds and cassia, are permitted only in cases of well marked intestinal derangement, and in the early stage of the fever. Order, cleanliness, ventilation, and fumigation with the acid gases, are strongly recommended, both as prophylactics and curatives.—From such a mode of treatment, we conceive that nothing but failure can be expected. If we are not to employ powerful means early in the disease, such as blood-letting, the exhibition of calomel, and the cold affusion, we might as well stand quietly looking on, and suffer the malady to take its course.

The measures adopted by the Board of Health, in concert with the municipality, were to order all vessels capable of making the voyage to proceed to Port Mahon; to cause the others to be completely purified, or sunk; and to encamp the crews of the whole of the vessels lying in the old harbour. On the 15th of August, eighteen deaths had occurred, and twenty-one persons were then sick, of whom three were convalescent. On the 15th of the succeeding month, the Board of Health, finding that the disease had penetrated to an alarming extent into Barcelona, removed to Santa Catherina de Pedralbes, and issued a proclamation, insulating the city and suburbs, and inclosing a small space of country around it by a cordon of troops. Any person from Barcelona attempting to escape through the line, without submitting to the prescribed quarantine, and obtaining a certificate of health, was punishable with death; and the same fate was declared to await such of the guards as were found neglecting or disobeying their orders. These measures, which equalled in severity those that have been employed to prevent the extension of plague, appear to have been attended with great difficulty in the execution, and to have caused much distress, as well as considerable danger of a dearth of provisions within the city. In the beginning of October, the Board addressed a letter on this subject to the Constitutional Council and Municipality of Barcelona; and from it we learn the painful situation in which the members of that Board found themselves placed;—unable to comply with

the earnest request of the Barcelonese that the cordon should be removed somewhat farther from the city;—harrassed by the clamorous complaints of different villages within the line, and by the resistance of those without to the admission of persons who had gone through the necessary probation and carried certificates of health;—and, above all, distressed by the deficiency of funds. They conclude their letter by appointing different convents in the neighbourhood of Barcelona as houses of observation, to which the inhabitants might move and undergo quarantine: urging also the propriety of forming encampments of tents and huts, on elevated grounds without the city, with a view to the same object. It does not appear, however, that the inhabitants of Barcelona entered cordially into this plan of removing from their homes, at which indeed we cannot feel surprised; for on the 21st of October the *Board of Emigration* in the city issued an address to the people, calling on them to remove. "Depart instantly, and fly from a spot where death has established his dominion,"—are the words in which they address their fellow citizens.

From this period, however, the malady appears to have declined, as the cold season advanced; and on the 17th of December, the constitutional alcaldes had the gratification of announcing to the inhabitants of Barcelona, that the disease had ceased its ravages, that the sanitary *cordon* would be withdrawn on the next day, and that the quarantine of the city would cease on the 24th of the month. The precautions, dictated by a belief in the existence of a virulent contagion, were however strictly commanded; and the purification of goods was peremptorily required, before they could be admitted into circulation.

Neither our limits nor our inclination will permit us now to enter into the question of the contagion of yellow fever: but we cannot dismiss this Report on the fever of Barcelona without adding a few remarks on the nature of that disease. Barcelona itself appears to be a delightful and healthy residence: but it is placed in the immediate vicinity of a low flat left by the retiring of the waters of the Mediterranean; and the harbour, from this cause, and from the bar formed by the confluence of the Besos and the Llobregat, is in danger of being choked up. We learn from Townsend, who is certainly one of the most intelligent and most philosophical of our English travellers in Spain, that "in Barcelonetta, and the citadel, intermittents never cease to rage, and to bring on in winter dropsies and jaundice, and in summer malignant fevers. The same diseases reign beyond Monjuich, in the low country watered by the Llobregat; but although the prevailing wind in its passage becomes loaded with miasmata, yet, being diverted from its course by that high mountain, it has no baleful influence on Barcelona." (Vol. i. p. 186.) Such being the state of health of this district, it is not difficult to conceive that the endemic fever of the country should, during a very hot season, like that of 1821, acquire extreme virulence, or even in some cases a contagious character; and the authors of the Report, with the exception of two individuals, admit that the fever did not prove contagious in the country beyond Barcelona, which seems to afford strong evidence that it possessed something endemic in its nature.

Under such circumstances, it appears to have been at once irrational and cruel to impose so many restrictions on the removal of the inhabitants from this devoted city. Towards the close of the disease, indeed, the plan of encampments was suggested, and partially executed:

but we cannot refrain from expressing our conviction that neither this step, nor the other effort which was made to arrest the extension of the fever, had any considerable effect; and that its cessation is to be ascribed chiefly to the arrival of the cold weather. During the widely spread epidemic of 1804, which extended through five of the Spanish provinces, we learn from Arejula that it did not appear in any of the towns before the end of June, and in few of them before August; that in most it was at its height in the month of October; and that all of the towns, excepting two, were declared to be healthy before the end of December.

On reviewing the account here given of the fever of Barcelona in 1821, we have unquestionably a body of facts proving at least the occasionally contagious character of the disease; although many of them are obviously overcharged, and some might perhaps be disproved by a narrow scrutiny. Enough is apparent on the face of the Report to convince us of the necessity of separating the sick from the healthy, and of adopting all those measures of ventilation and purifying which are usual in our own country during the prevalence of epidemic fever:—but we earnestly deprecate all idea of resorting to such harsh measures as those which were employed by the Spanish authorities, in the instance before us; for we are convinced that the inconvenience, distress, and terror, which these regulations produced, caused so much injury as greatly to counterbalance any effect which they had in checking the extension of the disease.

In the preceding pages, we have embodied not only the information contained in the Report, but also that which we have derived from the official documents given in an appendix.—The whole publication certainly possesses considerable interest and value: but the Report itself is deficient in perspicuity and arrangement, and does not exhibit so ample and detailed an account of the history and progress of the disease as we could have wished to receive.

GOETHE'S WILLIAM MEISTER.

The celebrated German novelist, *Goethe*, has published a continuation of his *Wilhelm Meister's Wanderjahre*, &c., Wilhelm Meister's Peregrinations, or the Self-denyers. The following chapter of the continuation, headed the "Flight to Egypt," is designed to introduce as it were, to our acquaintance, persons resembling the principal characters in the sacred Book. The adventure which it relates, forms a striking sample of the peculiar originality of the novelist, and best illustrates the singular structure of the work.

"In the shade of a mighty rock, on a gray spot, where the steep mountain-road winds round the corner of a promontory towards the valley in the bottom, *Wilhelm Meister* was sitting: the sun, which was still high, illuminating the summits of the firs in the chasmy deep below. He was writing something in his tablets, when *Felix*, who had clambered up the rock, came up with a stone in his hand. 'What do you call this stone, father?' said the boy.—'I do not not know,' answered *Wilhelm*.—'Is this gold that glitters in it?'—'No; and, now I recollect, I think they call it mica.'—'I shall keep the stone,'

said the son, and he put it in his pocket with others which he had been picking up.

"While this was happening, a singular appearance on the steep road drew their attention. Two boys, beautiful as the day, in gay dresses, made up like loose shirts, came running and jumping down the path, and *Wilhelm* had leisure to observe them, till on seeing him they checked their speed, and for a moment stood still. The head of the eldest was covered by curly flaxen locks, which first caught the notice of the gazer, until it settled on his clear blue eyes, and glanced complacently over his pleasing figure. The second, more like a friend than a brother, was adorned with brown and straighter hair, which mantled over his shoulders, and seemed to vie in darkness with his eyes.

"*Wilhelm* had scarcely time to contemplate these two beings, so unexpected in the wilderness, when the voice of a man from behind the screen of rock called out in an earnest but affectionate tone, 'Why do you stop? do not loiter in our way.' *Wilhelm* looked upwards; and if the sight of the children had surprised him, his astonishment now became greater. A strong, active, not very tall, youngish man, neatly clad, with brown skin and dark hair, stepped firmly and cautiously down the rock, leading after him an ass, which first presented its well fed and well caparisoned and well eared countenance, and next revealed the fair burden which it bore. A pleasing woman, seated on a quilted saddle, and wrapt in a blue mantle, was holding in her arms a sucking child, which she pressed to her bosom, gazing on it with inexpressible tenderness. The guide, like the children, paused on seeing *Wilhelm*, and the beast checked his foot: but the descent was so steep that his master could not hold him in, and the procession soon disappeared behind another rock, lower down.

"Nothing was more natural than that this vision should interrupt *Wilhelm*'s contemplations. He arose full of curiosity, and looked down the zig-zag declivity, expecting to catch another glimpse; and he was about to follow and to greet the wanderers, when *Felix* came running up, and said, 'Father, may I not go with these children to their house? They want to take me with them; and you may come too, the man said. They live at the bottom of the hill; let us go.'—'I will at least speak to them,' replied *Wilhelm*.—He overtook them on a spot where the road was less precipitous, and eagerly contemplated the group which had so strongly rivetted his attention. He could now remark many other little circumstances. The young man had a plane and other carpenter's tools on his shoulder, and a slender iron level. The children, who looked like angels, had bunches of reeds in their hands, resembling palm branches; and they had small baskets of eatables, such as little errand-boys carry across the mountains. The mother, when he examined her more nearly, was perceived to wear under her blue mantle a pale red close dress, so that our friend was singularly reminded of a painting which he had seen of the 'Flight into Egypt.'

"After mutual salutations, the young man addressed *Wilhelm*, who seemed lost in astonishment, and said, 'Our children are become friends, will you come and see whether their elders also suit one another?' *Wilhelm* hesitated an instant, and then answered, 'The spectacle of your family progress excites confidence, and, I must add, curiosity: for at the first glance I seemed to feel doubtful whether you

were real pilgrims, or spirits who had assumed the form to enliven this desolate scenery.'—'Come to our dwelling,' replied the carpenter. 'Come along with us,' repeated the children, taking *Felix* between them by the arms. 'Come with us,' said the woman, turning her eyes with a gentle expression of welcome to the stranger. Without more pause, *Wilhelm* said, 'I am sorry that I cannot immediately attend you: but this night at least I must pass at the frontier-house, where my luggage and my papers are left unpacked, and in disorder. That I may convince you, however, of my willingness to avail myself of your friendly invitation, I will give you my *Felix* as a pledge that I will follow you to-morrow. How far off do you live?'—'We shall reach our home by sunset,' replied the stranger; 'and you have not above four miles to return to the frontier-house. Your son shall be sheltered to-night, and we shall expect you in the morning.' The man and his beast proceeded; *Wilhelm* smiled significantly on seeing his *Felix* so readily received among the angels, from one of whom he obtained a bunch of reeds, and from the other a basket; and the procession was about to disappear behind a rock, when *Wilhelm* called out, 'By what name am I to inquire for you?'—'Only ask for Saint Joseph,' was the answer, which resounded from the deep; and the whole group was now again concealed behind rocks and lengthening shadows. Presently, a choral hymn ascended echoing from below, in which the voice of *Felix* seemed distinguishable to *Wilhelm*.

"He pursued his ascent, thus prolonging the sunset. The heavenly orb, of which he had more than once lost sight, shone on him again as he climbed higher, and it was still day when he reached his inn. Once more he cast a delighted glance over the expanse of mountain-scenery, and retired to his apartment to make memorandums, and take refreshments, before the hour of repose.—

"Already had the wanderer, with the guide whom he engaged, descended the steep rocks, passed the middle of the mountain, crossed a forest, and was walking on a gentle slope of meadow, into a cultivated valley, buried between hills, when a large monastery, half in ruins, attracted his attention. 'This is Saint Joseph,' said the guide: 'what a pity that such a beautiful church should go to decay, and that the trees and the ivy should be growing round the pillars and the windows.'—'Several parts of the building,' replied *Wilhelm*, 'seem in tolerable preservation.'—'Yes,' said the other, 'a kind of steward lives there, who collects the rents and revenues attached to the monastery.'—They had now passed a gate, which was open, and reached a roomy court, surrounded by heavy majestic buildings. Among the children playing in the court, *Wilhelm* perceived his *Felix;* the other two were the angels of yesterday. They came running to him, saying, that their father would soon be at home, and that in the meanwhile he had better go into the hall, and rest himself. *Wilhelm* was much struck with the room that they called the hall, which opened into the court, and was a neat spacious chapel, in good condition, but fitted up for household use. On one side stood a table, chairs, and benches; on the other were shelves with pottery and glasses: also some chests; and, though the arrangement was orderly, it announced habitual use. The light fell downwards from tall windows on one side: but the notice of the wanderer was most engaged by *al fresco* paintings on the wall below the windows, reaching down

to the dado. These paintings represented the history of Saint Joseph. In one, he was seen employed as a carpenter; and in another he was meeting Mary, when a lily sprang up between them, and angels hovered round. Here was his marriage; there the salutation of the angels. In another place he sate meditating over his axe, deliberating about putting away Mary, when the angel appeared to him in a vision. Elsewhere he was worshipping the new-born child in the stable at Bethlehem. Next followed an elaborate painting; many pieces of wood were sawed, and planed, and scattered about, when two of them accidentally formed a cross; the child had fallen asleep on these; and Joseph and the mother were looking on. Next occurred the flight into Egypt, which excited a smile in the wanderer, as it so precisely represented the scene of yesterday.

"Not long had he been gazing when the host came in, whom *Wilhelm* immediately recognised as the conductor of the holy caravan. After the natural greeting, discourse followed: but *Wilhelm's* attention still clung to the pictures. The host remarked the interest of his guest, and said, 'You are smiling at the adaptation of this building to its inhabitants, which is still greater than you suspect. In fact, the building has fashioned the inhabitants; for, when the lifeless is living, it may bring forth life.'—'O yes,' answered *Wilhelm;* 'I should be surprised if that spirit, which centuries ago operated so powerfully in this wilderness, and called into being so mighty a mass of buildings and possessions, which drew to itself so much power, and scattered so much improvement in the district,—I should be surprised if these ruins did not still exhale a force that acts on living beings. But let us not deal in generals; tell me your history; and let me know how it happens that the past revives in you, and that scenes of former days return.'

"While *Wilhelm* was awaiting the answer of his host, a gentle voice called from the court, 'Joseph!' The host hearkened, and went to the door.—'His name too is Joseph,' said *Wilhelm* to himself; this is singular; and yet not so singular as that he should so exactly personify his Saint. He looked at the same moment through the door, and saw the Madonna of yesterday talking with her husband: at last they separated, and the woman crossed over to another apartment. 'Mary,' said he, 'one word more.' '*Her* name too is *Mary*,' thought *Wilhelm;* 'I shall presently fancy myself carried back eighteen hundred years;'—and a mysterious antiquarian feeling came over him, as he regarded the ruins, and the stillness, and the mountainous enclosure.

"The host and the children now entered; and the latter invited *Wilhelm* to a walk, while some little household arrangements were making. They paced over the ruins of the pillared church, which seemed to defy the storm, although stately trees had struck root on the walls, and, mingling their boughs with ivy and with wall-flowers, formed a sort of hanging garden. A lively brook ran near; and from the rising ground beyond it *Wilhelm* saw, in its whole extent, a ruin become doubly remarkable to him from knowing its inhabitants.

"On their return, a table was spread in the holy hall. At the top, stood an elbow-chair, in which the lady of the house sat down: beside her, was a high basket, in which the infant reposed: at her left hand she placed her husband, and *Wilhelm* at her right. The children oc-

cupied the lower end of the table, and an old female servant brought in the victuals. Something of a very old fashioned air characterized both the repast and the vessels in which it was served: the children prattled; and *Wilhelm* steadily observed the behaviour of his hostess. After dinner, the party separated, and the host conducted his guest to a shady part of the ruin, whence the view extended down the long valley. 'It is time,' said he, 'that I should satisfy your curiosity, as I feel that you can sympathize in the wondrous destinies which surround us. This sacred institution, with whose remains you are become familiar, was dedicated to the Holy Family, noted for many miracles, and visited by many pilgrims of old. The church was consecrated to the mother and the son, but has been deserted these two hundred years; while the chapel, devoted to the holy foster-father, has preserved itself nearly entire, as well as a part of the convent. A temporal prince now collects its revenues, who employs a steward to reside here; and that steward am I, the son of the former steward, who also succeeded his father in the office. Saint Joseph, although his formal worship has long ceased, had been to our family so useful a patron, that you will not wonder at our forming for him a peculiar veneration. Hence I was baptized in his name, and this in some degree influenced my destiny. I grew up, attached myself to my father, and accompanied him in the collection of the rents, but felt perhaps a more intimate love for my mother, whose benevolent cares embraced the whole district, and who sent me occasionally on pious errands, and messages of charity.—As I was still young, and my shoulders did not always suffice to bring home the different things which my father had to collect, I accustomed a young ass to bear panniers, and drove him before me up and down the steep paths; while I followed him with the more pleasure because I found, from the paintings in the chapel, that this sort of animal had attained the honour of bearing both Christ and his mother. The chapel, however, was not then quite in the state in which you now see it, but was used for a stable, and for the stowage of wood and fuel. Happily the paintings were placed above the reach of injury; and even while a child I used to climb on the faggots in order to observe them. In short, I made out the history of my patron saint, and loved him as if he had been my uncle. As I grew older, and found that some means of maintenance were necessary, until I should inherit the steward's place, I gained the approbation of my parents to be a carpenter, with the instruments of which trade the paintings had made me acquainted. I think that my choice was particularly determined by the picture at the south end. An order was given to Saint Joseph to make a throne for Herod, which was to stand between two stately columns; he took the measure carefully: but, when he came to put the throne up, he found it too tall, and not broad enough. Knowing the character of Herod, the carpenter became perplexed; when the little Jesus, seeing him uneasy, bade him take hold of the throne on one side, while he took hold on the other, and they began to pull. Immediately, as if it had been made of leather, the height yielded, the seat dilated, and the throne fitted its position exactly, to the great comfort of Joseph, and to the satisfaction of the monarch. This is the miracle represented in that painting; and formerly all the carving of the throne was visible, which the painter could render elaborate more readily than the maker.

All this induced me to view in a very honourable light the occupation which I had chosen; and, as I found in the neighbourhood a very good instructer and master, I learnt my trade properly, within reach of my parents, whom I regularly visited on holidays, and who often employed me as heretofore. Among the persons to whom my mother's attentions were willingly given, young women in a hopeful state stood foremost, as I could progressively remark; though in such circumstances a somewhat mysterious use was made of me as a message-bearer. I was sent, not directly to the individuals, but to an elderly woman, who lived near, in the valley, and was called Mrs. Elizabeth. My mother, who was herself experienced in the art of midwifery, kept up much intercourse with Mrs. Elizabeth, who used to act as a sort of nurse for lying-in women; and I soon heard in various quarters how many of our young folks had been brought into life by these two females. The mystery with which Elizabeth always received me in her very neat cottage, and the decorous repression of my occasional inquiries, gave me a high veneration for her.

"'Peace had long prevailed in our country, but at length a war broke out. I was driving one day my beast of burden as usual in a well known path, when I found a female sitting or rather lying, in a hollow, under a canopy of verdure, on the bank of a hedge. She appeared asleep, or in a swoon. When I approached her with offers of assistance, she opened her beautiful eyes, and rose up, exclaiming, 'Where is he? Have you seen him?' I asked whom? 'My husband,' replied she.—From her very youthful appearance, this answer was unexpected by me; yet I the more readily continued to offer her any services that she might need, and to assure her of my sympathy. I learnt that the two travellers had been obliged to desert their carriage, on account of the rockiness of the roads, and to take the footpath; and that, being attacked by armed men, her husband had drawn his sword in her defence, and had in the combat been hurried to some distance. She could follow him no farther, and had fainted on this spot, where she had lain she knew not how long. She begged me to quit her, and to hasten after her husband. She then rose, and the most beautiful figure stood before me: but I could easily perceive that she was in a condition which might soon require the aid of my mother and Mrs. Elizabeth. We contended awhile, for *I* wished first to put her in a place of safety, and *she* wished first to obtain news of her husband. She would not quit the trace of him, and all my representations would perhaps have been fruitless, had not the captain of our militia, which had been embodied on account of the neighbouring disturbances, passed with some of his men through the forest, and undertook to seek the husband, and to inform him where to find his wife. I now removed my panniers into a cavern which I knew, and which had often served me as a place of deposit; accommodated the saddle for a person to sit on it, and not without strange emotions lifted the fair charge on to my willing beast, which knew of itself the road home, and with quiet steadiness left me to pace beside him. You may imagine how I felt. I long had sought that which I now seemed to have found. It was as if I dreamt, or rather as if I woke from a dream, and saw it realized. That heavenly figure, which I had seen in the picture hovering in the air, and at other times mingling among mortals, was seated before me. Sometimes, if we came to an open spot, she would

beg me to look around, to stop and to listen; and she entreated with such grace, such deepfelt tenderness, that I could not but do every thing in my power. I climbed a tree to seek wider intelligence, and when I jumped down a sort of cry of anxiety escaped her, lest I should have suffered injury by the exertion.

"'Already she had attached me to her for life, when we reached the dwelling of the good Elizabeth, and I felt that a painful separation was at hand. In assisting her to dismount, I kissed the neatest shoe that I had ever seen, without her perceiving it. Having helped her down, I called through the house door, 'Mrs. Elizabeth, you are wanted.' The good old lady came, received the fair stranger, comprehended her situation, and conducted her up stairs. I embraced the good woman, and stood awhile at the door with my beast, like one who has safely deposited a precious burden, and remains as poor a carrier as before.—I hesitated to withdraw, irresolute what to do, when Elizabeth came back to the door, and begged me first to bring my mother to her, and then to gain intelligence of the husband. 'Mary earnestly begs you to do so,' she added. 'Cannot I speak to her once more?' I said. 'No,' replied Elizabeth, 'that cannot be,' and we parted. In a short time, I reached our dwelling, and that very evening my mother went to the assistance of the young stranger. I hastened round the country, and hoped to get information at the custom-house: but the people there were uncertain of the event. The lovely form floated before me, now tottering on the beast, and now looking down on me so wo-begone, yet so kindly. For her sake, I should not have grudged the husband his life; yet I fancied her a widow quite as willingly. At length, it was ascertained that the carriage had been recovered, but that the unfortunate husband had died of his wounds in a village not far off. This melancholy account had travelled, I was told, by another person to the house of Elizabeth, so that I had no reason for going thither; and yet I found myself before evening at her door. The house was shut, but there was light in the chamber, and I saw shadows moving on the curtain: but I did not like to knock, and went away.

"'Why should I dwell on all these details? Some days elapsed before the women chose that I should come near them: they had learnt the sad news, and did not want my farther help. A week or more afterward, Elizabeth called me in, desiring me to step softly, and follow her. She took me into a neat chamber, where I saw in the corner, sitting upright in a bed, with curtains half drawn, my fair stranger. Elizabeth went towards her, as if to announce me, took something out of the bed, and showed me, wrapt in the whitest linen, a beautiful boy. She held him just between me and the mother, and I thought of the lily-stalk which sprouts up in the picture between Mary and Joseph, as an emblem of the purity of their relation to each other. From that moment, a load seemed lifted off my heart, and I felt assured of my eventual happiness. I could approach her freely, bear the glance of her celestial eye, and print a hearty kiss on the forehead of the babe. 'How I thank you,' said the mother, 'for your notice of my orphan child!' Heedlessly and with warmth I exclaimed, 'He needs not be an orphan, if you will.'

"'The thought of that moment, so big with fate to me, still haunts me in my wanderings. Weeks and months rolled by. Mary was

recovered, and I often saw her. The circumstances of her family allowed her to engage a respectable dwelling: she staid awhile with Elizabeth, and then came to visit my mother, and to thank us, as she said, for our friendly aid in her distress. She liked to be with us, and I hoped that I had my share in contributing to her comfort. That which I wanted to say, and did not dare to say, came out wondrously in the chapel. I was explaining to her the pictures, and dwelt warmly, and so as to bring tears into my eyes, on the duties of a foster-father. She too was melted; and I deemed myself now sure of a return of regard, although the time was not yet come for effacing the memory of a previous attachment. The law accustoms widows to mourn a year and a day; and certainly, to a feeling heart, that length of time is necessary to soften down the painful impression of a great loss. At last it elapsed, and I mentioned to my mother the wishes of my heart. She related to me how deeply Mary had suffered for the loss of her husband, and that only from the conviction that she was bound to live for her child she had been able to recover her powers. By degrees, my attachment was the subject of conversation among the women, and Mary became accustomed to the idea of living under our roof. She passed some time in the neighbourhood, but at length we married. The original feeling which connected us has not expired: the duties and the pleasures of a foster-father and father are united in me; and, by a curious coincidence, the number of our offspring is the same with that of the Holy Family. We endeavour at a humble distance to imitate the virtues of our models, and to cultivate that piety and purity of sentiment for which they have been venerated.'"

OBITUARY—SIR WILLIAM HERSCHEL.

This distinguished astronomer died at his house at Slough, on the 26th of August, in the 84th year of his age.

Sir William Herschel was born in November, 1738; his father being a musician, brought up his four sons, of whom Sir William was the second, to the same profession, and placed him at the age of 14, in the band of the Hanoverian Foot Guards. Unable, however, long to endure the drudgery of such a situation, and conscious of superior proficiency in his art, he determined on quitting the regiment, and seeking his fortune in England, where he arrived about the end of the year 1757. After struggling with great difficulties in London, he was engaged by the Earl of Darlington to superintend and instruct a military band then forming by that nobleman in the county of Durham, and the opening thus afforded contributed so far to increase his reputation and connexions, as to induce him to spend several years after the termination of this engagement in the neighbourhood of Leeds, Pontefract, Doncaster, &c., where he had many scholars, and led the public concerts, oratorios, &c.

In 1766, he was chosen organist at Halifax, a situation he soon after resigned for the more advantageous one of organist at the Octagon Chapel at Bath. In this great and gay resort of fashion, his extraordinary musical talents procured him ample employment, and the direction of the public concerts, and his private teaching, produced him a considerable income.

But though fond to enthusiasm of his profession, his ardent thirst for knowledge had begun for some time past to open a nobler field to his exertions. While at Halifax, he had commenced a course of mathematical reading; and in spite of the difficulties of such studies, acquired without assistance a considerable familiarity with the principles both of pure and mixed mathematics. The sublime views disclosed by the modern astronomy had powerfully attracted his attention; and when he read of the noble discoveries made by the assistance of the telescope, he was seized with an irresistible desire to see with his own eyes the wonders he read of. *Fortunately* the price of an instrument capable of satisfying his curiosity was beyond his means, and he resolved to attempt the construction of one for himself. In this arduous task, after encountering endless difficulties, he succeeded, and in 1774, first saw Saturn in a five feet reflecting telescope made by his own hands. Encouraged by this success, he now attempted larger telescopes, and soon completed a seven, a ten, and a twenty feet reflector, labouring with such obstinacy as to have actually finished no less than 200 object mirrors before he could satisfy himself with the performance of one.

Astronomy now occupied so much of his attention, that he began to limit his professional engagements, and restrict the number of his scholars.

About the latter end of 1779, he commenced a regular review of the heavens, star by star, with a seven feet reflector; and having already continued this upwards of 18 months, he was at length rewarded on the 13th of March, 1781, with the discovery of a new primary planet, to which he afterwards gave the name of *Georgium Sidus*, now more generally distinguished by that of *Uranus*.

In consequence of this memorable discovery, the attention of the scientific world became fixed upon him; and his late Majesty, with a promptitude of liberality which must ever be recorded to his honour as a patron of science, enabled him by the settlement of a handsome salary, to discontinue his professional exertions, and devote the remainder of his life wholly to astronomy. In consequence of this arrangement, Herschel immediately quitted Bath, and took up his residence at Datchet, in the neighbourhood of Windsor, where he was no sooner established, than he entered on a career of discovery unexampled, perhaps, in the history of science. Having removed to Slough, he commenced the erection of a telescope of yet larger dimensions than any before attempted, which he completed in 1787, and aided by this stupendous instrument, and by others of hardly inferior power, extended his researches to every part of the heavens, penetrating into regions of space of a remoteness eluding calculation, and developing views of the construction of our own system and the universe, of a daring sublimity, hardly more surprising than the strictness of the induction on which they rest.

In these observations and the laborious calculations into which they led, he was assisted throughout by his excellent sister, Miss Caroline Herschel, whose indefatigable and unhesitating devotion in the performance of a task usually deemed incompatible with female habits, surpasses all eulogium. His discoveries were communicated as they arose to the Royal Society, and form an important part of the published transactions of that learned body from the year 1782 to 1818.

In 17—, he married Mary, widow of the late John Pitt, Esq., and the accession of domestic happiness he experienced from this union, while it testified the justness of his choice, contributed powerfully to cherish that calm tranquillity of mind which is the native element of contemplative philosophy, and the soil from which its shoots rise most vigorous and most secure.

In 1816, his present Majesty was graciously pleased to confer on him the Guelphic order of knighthood. His astronomical observations were continued within a few years of his death, till his declining strength no longer keeping pace with the activity of his mind, he sunk at length full of years and glory, amidst the applause of the world, and, what was far dearer to him, the veneration of his family, and the esteem and love of all who knew him.

Sir William Herschel has left one son, who, with his father's name, inherits his distinguished talents.

LIFE OF KLAPROTH, THE CELEBRATED CHEMIST.

BY E. G. FISCHER.

Read in the Academy of Sciences at Paris.

Martin Henry Klaproth was born at Wernigerode in Dec. 1743, and died at Berlin in January, 1817. His father, a citizen of Wernigerode, having had the misfortune to lose his property by a great fire in 1751, was able to do little or nothing for the education of his children. Klaproth obtained such meagre instructions in the Latin, language, as the school of Wernigerode afforded, and was obliged also to procure his small school fees, by singing as one of the church choir. The unmerited hard treatment which he met with at school, so disinclined him to study, that he determined, in his 16th year, to learn the trade of an apothecary. Five years which he was forced to spend as an apprentice, and two which he passed as an assistant in the public laboratory at Quedlinburg, do not seem to have furnished the best education for a great chemist; for they placed him out of the reach of scientific study, and, instead of that, secured nothing for him but a certain mechanical adroitness in the most common pharmaceutical preparations.

He always regarded, as the epoch of his scientific instruction, the time when he first entered the public laboratory at Hanover, in which he spent two years. It was there that he first met with some chemical works of merit, especially those of Spielman and Cartheuser, in which a higher scientific spirit already breathed. The love of science, thus awakened, naturally aimed at a more complete development. In 1768 he was placed as assistant in the laboratory of Wendland, at Berlin. Here he employed all the leisure which a conscientious discharge of the duties of his station left him, in completing his own scientific education; and he applied himself with great zeal to the study of the Greek and Latin languages. In 1770, he was permitted, by fortunate circumstances, to go to Dantzig, as assistant in the public laboratory. But in March of the following year, he returned to Berlin, as assistant to Valentin Rose, at that time one of the most

distinguished chemists of his day. But this connexion did not continue long, for Rose died in 1771.

After a most honourable and long-continued trial, he became superintendant of the establishment of Rose, in which a greater number of distinguished chemists were formed than in any other, since, beside the elder Rose and Klaproth, this establishment afforded a larger or smaller portion of their education to Hermbstadt, Gehlen, Valentin, the younger Rose, and several other excellent pharmacopolists. Klaproth not only superintended this office for nine years, with the most exemplary fidelity and conscientiousness; but, what particularly displayed his honourable character as a man, he himself undertook the education of the two sons of Rose, as a second father to them.

In the year 1780, when Klaproth was thirty-seven years of age, he went through his examination for the office of apothecary, with distinguished applause. His Thesis, "On Phosphorus and distilled Waters," was printed in the Berlin Miscellanies for 1782. Soon after this, Klaproth bought the Flemish laboratory in Spandau-street; and he continued in possession of this laboratory till the year 1800, when he purchased the room of *the academical chemists*, in which he was enabled, at the expense of the academy, to furnish a better and more spacious apartment for his labours, for his extremely valuable mineralogical and chemical collection, and for his lectures.

As soon as Klaproth had brought the first arrangement of his office to perfection, there appeared, in "Crell's Chemical Annals,"—in the "Writings of the Society for the Promotion of Natural Knowledge,"—in "Selle's Contributions to the Science of Nature and of Medicine,"—in "Köhler's Journal," and in other periodical works, a multitude of essays by him, which drew the attention of all chemists, and gained for him the rank of the first analytical chemist in Europe. Of these labours, we may mention only an "Essay on Copal," "On the Elastic Stone," "On the Pearl Salt of Proust," "On the Green Lead-Spar of Tschoppau," "On the best Method of preparing Ammonia," "On the Carbonate of Barytes," "On the Wolfram of Cornwall," "On the Wood Tin-Ore," "On the Violet Schorl," "On the celebrated Aerial Gold," "On Apatite," &c. &c.

In 1788, he was adopted as an ordinary member of the Physical class of the Royal Academy of Sciences at Paris. From this time, not only all the volumes of the French academical memoirs, but several daily papers, contained a multitude of new discoveries by this accomplished chemist. Amidst all these labours, it is difficult to say, whether we should most admire the fortunate genius, which in all cases readily and easily divined the point where any thing of importance lay concealed, or the acuteness which enabled him to find out the best means of obtaining his object,—or the unceasing labour, and the incomparable exactness with which he developed it,—or, lastly, the pure scientific feeling under which he acted, and which was removed at the utmost possible distance from every selfish, every avaricious, and every contentious purpose.

In 1795 he began to collect his works, which were dispersed among so many periodical publications, and edited them under the title of "Contributions to the Chemical Knowledge of Mineral Bodies." Of this work, which must always be a classical production in chemical

literature, six volumes had appeared by the year 1815; containing, in no fewer than 207 treatises, the most valuable part of all that Klaproth had done for chemistry and mineralogy.

Besides Klaproth's own printed works, he superintended a new edition of Gren's Manual of Chemistry, with respect to which, however, he did not seek to earn so much merit by what he added, as by what he took away and corrected. But the part which he took in the Chemical Vocabulary, which was edited under his own name, and that of Wolff, was of great importance. Passing by the numberless small expedients which Klaproth devised for procuring a more unmixed deposition and separation of all kinds of matters, we only notice at present that he enriched experimental chemistry with two new methods of analysis, which are unlimited in their applications. The first of these was the complete resolution of the hardest minerals by means of fluid caustic alkali, instead of the former treatment with dry caustic alkali, which had introduced the use of silver crucibles and saucers into experimental chemistry. The complete resolution of the hardest stones, by this method of analysis, has enabled us to ascertain, with extreme accuracy, the quantity of earths, oxydes, metals, and even of acids, which minerals contain. Exact analyses of this kind remain sure forever, and are of importance to the science, independent of any discoveries which may be made, respecting the particular nature of the substances mentioned. As, for instance, the capability of being decomposed, which was afterwards discovered to belong to the earths, makes not one cypher incorrect or superfluous in such analysis. The advantage of this method is particularly evident in the decomposition of corundum, or diamond-spar. As Klaproth first attempted the analysis of these bodies by the former method of decomposition, he found a considerable remainder of matter unaccounted for. On the suspicion, which he then expressed, that this remainder might perhaps be a new, and yet undiscovered earth, many compilers of school-books were in a hurry to admit the earth of corundum into the list of the simple earths. But, when Klaproth repeated the analysis by means of the liquid alkali, he found, that this substance was one of the many compositions of siliceous and argillaceous earths which had not previously been known, and which in former analyses had sometimes been referred to the one kind of earth, and at other times to the other. In the same manner, the chemists of England gave an account of a species of sand, which had been brought from New Holland, as a new earth; but Klaproth showed, by his new method of analysis, that this body also, which had already been introduced, into introductory treatises, under the name of "the Austral Earth," was nothing but an intimate mixture of siliceous and argillaceous earth. Indeed, the first analyses that can be considered as certain, are those which have been undertaken on this plan. Hence, by this discovery, almost all the more early analyses have lost their value. Of what inestimable moment such a discovery must be, not merely to experimental chemistry, but to the whole of the science of nature, even although Klaproth had not discovered by means of it a single unknown body, does not require to be more particularly stated.

The great care which Klaproth employed in securing the neatness of his experiments, was not the least of his merits, not only because

the great confidence which his labours deserve rests chiefly upon this circumstance, but also because in this he was a pattern to all practical chemists. To this quality, must be referred the attention which he bestowed on his instruments. When he had to do with very hard minerals, he used a mortar of flint, but he previously analysed it, and did not neglect the small and scarcely perceptible increase of weight which the matter under examination derived from continued rubbing, and, according to the differences of the substances that were before him, it was by no means a matter of little moment in his estimation, whether the pounding, which was always continued till the body was reduced to an impalpable powder, was conducted in vessels of flint, of calcedony, of glass, of serpentine, or of metal. And, when he operated with fire, he always selected his vessels, whether of earthenware, of glass, of graphite, of iron, of silver, or of platina, upon fixed principles, and showed more distinct than chemists had previously been aware, what an effect the vessel often has upon the result. Not less important was the extreme care which he used in preparing pure reagents, for obtaining which in their most perfect state, he invented several efficient methods.

Nor must we pass unnoticed his scientfiic manner, both in oral delivery and in composition. His language was simple and unadorned, but clear, well defined, and condensed. He never used more words than were absolutely necessary for a complete elucidation of the matter in hand. He rather pointed out than entered into any discursive exhibition of the grounds of his operations;—in general, he employed few reasonings, and only a simple statement of the essential circumstances of an experiment, and of its consequences. It was particularly remarkable in him, however, that neither in his oral communications, nor in writing, neither in plain words nor by hints, did he ever attempt to exalt his own discoveries, or to bring them nearer either to the eye or the ear of his hearers. His pupils never heard from his own mouth how much science had been indebted to him, so utterly averse was he to all vanity, all boasting, and all selfishness. In a word, truth and science were every thing with him; the moment these began to occupy him, every other interest was hushed, and passed into the back-ground.

How susceptible he was of the impression of new views, was distinctly seen at the time of the antiphlogistic chemistry, when, with the utmost alacrity, he overturned his whole previous system, the moment he was convinced, by a careful repetition of the experiments, of the correctness of the facts on which Lavoisier had founded his new doctrines. Even in his advanced years, he did not tenaciously adhere to his old views. In early life he had adopted, like all other chemists, the doctrine of affinities proposed by Bergmann, as the foundation of his explanations, although he took many opportunities of warning those who attended his lectures respecting its insufficiency. When Berthollet's investigations respecting the laws of affinity appeared, he completely satisfied himself of the untenable nature of his former views; and, although he did not think that, in regard to several particulars, he could assent to the decisions of the ingenious French chemists, he was yet perfectly satisfied as to the correctness of the principle on which all the investigations of Berthollet proceeded, namely, that no one power is adequate to the explanation of chemi-

cal phenomena, but that, even in the case of the simplest composition or resolution, several powers unite their energies. He also admitted the necessary consequence of this principle, namely, that it is impossible to arrive at a true scientific theory in chemistry in any other way, but by the most careful consideration and investigation of the laws, according to which the individual active powers and circumstances, that is to say, the powers of cohesion and of expansion, fluidity, gravitation, quantity, heat, light, electricity, and so forth, produce their effect.* Klaproth perceived that those only who were conducted as by the hand by the presiding deity of the mathematics, could make any considerable advances in the path which Berthollet had opened upon; and he was hence sorry that his defective education when at school had permitted him only to obtain a very superficial acquaintance with that science, in which, with better opportunities, he would unquestionably have made considerable progress, since, even without the aid of that science, he had been able to appropriate to himself, in a very high degree, the exactness and solidity of the mathematical talent.

At an advanced period of life, Klaproth changed his early views in regard to many objects, as, for instance, with respect to the problematical body, named muriatic acid; with respect to the impossibility of decomposing the alkalies and earths, and several other points; and by these changes of opinion, he showed, that even advanced years had not deprived him of the power of being struck by new views and ideas. With so many distinguished scientific claims, it is not to be wondered, that all the learned societies in Europe, whose object was in any way connected with physical science, should have reckoned it an honour to have the name of so illustrious a man in the list of their members. Besides the two Academies of Science and of Arts in Berlin, he was also a member of the Academies of Paris, London, Petersburg, Stockholm, Copenhagen, and Munich, and of many associations of learned men at Edinburgh, Berlin, Paris, Moscow, Brussels, Erfurt, Halle, Erlangen, Jena, Potsdam, Leipsic, Hamm, Rostock, and other places. Among his papers there was found, after his death, not less than thirty diplomas from learned societies; and the king (of Prussia) added to these honours, in the year 1811, the order of the Red Eagle of the Third Class.

The State, too, in acknowledgment of Klaproth's merits, rewarded his industry in a variety of ways. So far back as the year 1782, he had been assessor in the Supreme College of Medicine and of Health, which then existed; at a more recent period, he enjoyed the same rank in the Supreme Council of Medicine and of Health; and when this college was subverted in 1810, he became a member of the medical deputation attached to the ministry of the Interior. He was also a member of the perpetual court commission for medicines. His lectures, too, procured for him several municipal situations. For as soon as the public became acquainted with his great chemical acquirements, he was permitted to give, yearly, two private courses of lectures on chemistry, one for the officers of the royal artillery corps, the other for persons not connected with the army, who wished to ac-

* Words without meaning, and powers of nature created by the errors of the age; which, in due time, must render obsolete the writings of modern chemists.—*Translator.*

complish themselves for some practical employment. Both of these lectures assumed afterwards a municipal character. The former led to his appointment as professor of the Artillery Academy, instituted at Tempelhoff, and after its dissolution to his situation as professor in the Royal War School. The other lecture procured for him the professorship of chemistry in the Royal Mining Institute. On the establishment of the present university, Klaproth's lectures became those of the university, and he himself was appointed ordinary professor of chemistry, and member of the Academical Senate. Besides these public lectures, our departed friend was an active member from 1797 to 1810, of a small scientific society, which met yearly, during a few weeks, for the purpose of discussing the more recondite mysteries of the science, and of which all the members retain lively recollections.

FROM THE NEW MONTHLY MAGAZINE.

THE SILENT RIVER: A DRAMATIC SKETCH.*

The Interior of CALEB'S *Cottage.*

CALEB—RAYLAND.

Rayland. Gone hence this half hour, say'st thou? Tell me, friend,
Could'st thou not overtake him?—'Tis of moment
What I would say.
Caleb. He must pass up the river
To where his road runs o'er it, for the floods
Have left the moor too moist in that direction
To be with ease attempted. If I make
My way across, I shall be soon enough,
For he has many windings, and the stream
Is strong against him.
Rayland. Hasten, then,—your pains
Shall not in vain be used. And, lest he feel
Unwilling to return (*writing on a leaf of his pocket-book*) deliver this.
MARY (*singing without, in a melancholy tone*)
"So under the wave, and under the wave,
Beneath the old willow tree,
With the weeds for my pall, in a deep, deep grave,
Shall my false love find me."
Rayland. That is a moving voice!
Caleb. It is Luke's wife.
'Tis their first parting, and she feels it sorely,
Though for so short a time.
Rayland. Pray send her here;
I'll talk with her till he returns. (*Stands meditating.*)

RAYLAND—MARY.

Rayland. So fair!
So delicate! Lady (for such I'll call you)
I've heard that Luke, the fisherman, did wed
Something beyond himself, but 'tis not possible
That thou art she!
Mary. O, Sir, I thank the Heavens
You are as out in this as when you say
That Luke did wed beyond him. It was I
Who play'd the usurer in that bargain.
Rayland. Well—
But yet, methinks, more fondly said than truly.

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* Continued from page 287.

Forgive me, pretty friend, nor think I ask
Aught without plenteous reason. By what means
Hath he maintain'd thee for these many months?

Mary. It was but now you named his toilsome trade.

Rayland. 'Tis a bleak place to yield subsistence.

Mary. Yes;
But Luke was labouring for his wife, and then
Even the deserts and the floods grew kind.

Rayland. (*after a pause.*) You said he ne'er was succour'd at the hands
Whence Nature should have wrung as much—I mean
His father's?

Mary. Sir, I pray you pardon me;
I said not so.

Rayland. But ne'ertheless, 'tis true:
And thou who art so tender of that father
Wert driven from his mansion destitute.
Thou seest that I know much. Now, then, confess
How oft distress hath made him curse that father
For much of his forlorn existence, which,
With other usage, had not ask'd repentance

Mary. You question strangely, Sir; but since it takes
No leave of truth to answer proudly—Never.
No babe e'er saw the world, no saint hath left it,
With less to answer than my loving Luke.
He never mention'd his relentless father
Without becoming reverence; and then
I've heard him sigh to think how bitterly
The mem'ry of an unoffending son,
Left from his infancy to all the ills
Of unprotected poverty, would hang
Upon that father's death-bed. I have said
Too much, but 'twas to shield *him* from reproach.

Rayland. No; not a jot too much. 'Tis a hard life,
Your husband's—and laborious by night
As well as day?

Mary. Oh, often I have watch'd
'Till the grey dawn hath peep'd into my lattice,
And found me lonely still.

Rayland. But now 'tis summer;
And, as I think, his work by night is only
For the wild winter-fowl. It must be long
Since you watch'd last?

Mary. No longer than last night:
But then he went to see a dying friend,
And brought back that which smooths his nights hereafter.

Rayland. (*apart.*) 'Tis even so! Despair hath driven him
To gain by rapine what more guiltily
I did deny him. Poor, unhappy son!
How must thy heart have writhed to do this crime!
It is in pity to thyself, not me,
That Heaven hath set it down thy first, and chance
Directed thee towards a prize, already
Meant as an earnest of thy father's love.
God, how prophetic thou didst make my conscience!
Soon as his trembling hand was on my rein,
And I beheld, then for the first sad time,
That pallid countenance in its agony,
I bound myself, as if the deed were mine,
To keep the fearful secret; for I felt
I could expect no otherwise to meet him.
And here's the faithful mate of all his sorrows
Excepting *one*;—one she must never know,
To clog the tongue which loves to speak his praise.
(*aloud*) Most fair—most worthy of all love and bliss,

Say, if Lord Rayland came with penitence
To seek the long neglected Luke, and raise
The lowly peasant to the peer's proud son,
Could'st thou forget thy days of lamentation—
Forgive the hand which would not snatch thee from them?

Mary. Lord Rayland!

Rayland, (*embracing her.*) And thy father.

Mary, (*sinking at his feet.*) Oh, my lord:
I have pray'd Heaven to let me see you once!

Rayland. Once, and forever! And I give thee thanks
That thou'rt too mild to bow with thy reproach
One who already trembles with remorse.
But sort me not with those with whom the wrench
Of Nature's links is pastime. Years were gone
Before I knew my blood was in the veins
Of any but the sons beneath my eye;
And then 'twixt justice and thy husband stood
A haughty woman, jealous of her own.
O'erruled in part, I yet commission'd one,
Who proved unworthy of his trust, to make
Such poor amends as could by gold be compass'd,
For absence of parental countenance.
Oh, it was wrong! and I have paid it deeply!
It hath brought down misfortune in such weight
As might almost be look'd on for atonement.
Amongst the rest, my wife is dead, my children
Or dead, or worse in disregarded duty.
My home is solitary but for thee
And him thou lov'st.

Mary. And who will over-pay
In all a son should be, whatever grief
May elsewhere have befallen thee. My lord,
You come to bring us wealth, and ne'er can know
The half of that son's worth. You should have come
In want, in sickness, and in sorrow too:
Then you had seen how his elastic arms
Had labour'd for your comfort. Then you had felt
How much too tender is that manly heart
To hoard the memory of suffer'd ills.

Caleb rushes in in great horror.

Rayland. What is it, man? speak out.

Mary. God's mercy, Caleb,
Why is your look so dreadful? Nought of *him?*
Nought of my husband?

Rayland. He is dumb with fear!

Caleb. Would I were so for ever!

Mary. Thou hast something
Of matchless horror to relate! My husband!
Oh, quickly speak,—my husband!

Caleb. Did you mark
No strangeness in his manner when you parted?

Mary. No—nothing—yes—Oh, God! I charge thee speak!

Rayland. Speak out, I tell thee, peasant! I'm his father.
Thou sure canst tell what I can stand to hear.

Caleb. I used my utmost speed, but the deep fen
Clung to my feet and pluck'd me back, as though
It were in league with that most damned whirlpool.
(*They stand motionless.*)
My heart misgave me, whilst I struggled on.
I thought of his last look, and labour'd harder,
And came within a stone's throw of the bank.
The stream has nothing to oppose its course,
And glides in deadly silence. Then I heard
The name of "Mary," and a plunge, and then

A suffocating gasp—I heard no more;
But dashing through the rushes which conceal'd
The drowning man, beheld a quivering arm
Just vanish in the greedy whirlpool's gorge!

Mary. But—but—thou say'st—I know—I see thou say'st
It was not he—my husband—God! O, God!
(*She falls into the arms of Rayland.*)

Rayland. Thou loitering slave! what need so many words?
Thou'dst have me think it was indeed my son.

Caleb. A boat had drifted to the shore—'twas Luke's—
I leap'd into 't, and shouted loud for help,
Which, haply, was at hand. Alas, alas!
None ever rose and none hath e'er been raised,
Alive or dead, from that dark place! I left
My breathless friends lamenting on the bank:—
Their toil was fruitless.

Rayland. Awful, heavy wrath!
But it is just.—O, my devoted son,
Sharp misery ne'er wrung a tear from thee
So burning as the one which thou thyself
Hast call'd up from thy father's heart!—But how—
But how canst thou be sure it was my son?

Caleb. I saw him yesterday wrought to a pitch
Beyond his custom of impatient grief.
'Twas one of many blank successless days,
And he talk'd madly of his wife and famine.
I left him late upon the moor—this morn,
As I return'd from Willow Mead, I found him
In strange disorder at his cottage door.
He told me he had slept; his wife just now
Assured me that he was not home all night,
And, when he came, he brought a purse of gold.—
My Lord, I'm sure you best know how he got it.

Rayland. Well, well—thou'dst not betray him—would'st thou, man?

Caleb. Not I indeed, my Lord. Fear, shame, and anguish,
At what despair and his necessity
Had done, no doubt, hath caused this dreadful end.

Rayland. (*after some ineffectual attempts to speak.*) Hast thou a bed to lay this innocent on?

Caleb. Within, my lord:—my wife does love her well,
And will watch by her tenderly.

[*Rayland supports her out slowly and in great agitation. Caleb, having endeavoured to preserve his firmness, throws himself into a chair and bursts into tears.*

Poor Luke!
This is the saddest way he could have left us.

Rayland. (*returning and looking earnestly at him.*) Good peasant, thou, on whom he had no claim
Of kindness, wert the only one of all
Who used him kindly.—Where's that cruel gold?

Caleb. My Lord, she gave it in my charge just when
You entered.—It is here (*raising it from the table.*)

Rayland. Let me look on it—
Away with it, in mercy.—You are poor,
And my son leaves it to his only friend.
But mark me, as thou hopest, that it will buy
Prosperity, be choicer of his secret
Than of thy life.—Now lead me where he lies—
'Tis just, most just—I came not at his need,
And angry Heaven hath snatch'd him up from mine.

Miscellaneous Notices,

From the Scientific Journals of London and Edinburgh.

PATENT.

To Benjamin Thompson, of Ayton Cottage, Durham; for a method of facilitating the conveyance of Carriages along Iron and Wood Railways, Tramways, and other Roads.—Oct. 24, 1821.

This invention consists in the application or use of two or more fixed or stationary steam or other engines, placed upon the railway, tramway, or road intended to be used, at such a distance from each other as the nature of the line chosen shall render most convenient, and in such a manner, as that the action of such steam, or other engines, shall be interchangeable and reciprocal, in the mode hereinafter mentioned.

There are various modes in use by which animal and mechanical powers are made available for the purpose of conveying carriages upon rail and tramways, where the trade or carriage is principally, or altogether, in one direction. Fixed engines are employed to draw loaded carriages up inclined planes, the empty carriages being enabled by their gravity, and the declination of such planes, to run down the same, and take out the rope from the engine along with them. Self-acting inclined planes are made use of where it is expedient to pass loaded carriages down declivities sufficiently great to allow their pulling upward an empty set of carriages at the same time. And, where neither the acclivity nor the declination of a road is such as to admit of one or the other of these methods being adopted, then horses are used for the purpose of drawing the carriages, and in some, although very few instances, locomotive engines. Endless chains have also been applied, but, owing to the great friction, and consequent waste of power, attendant on them, their use has been very circumscribed, and their application limited to comparatively very short distances. These modes, combined or separately, according to circumstances, have hitherto afforded the means by which rail and tramways have been travelled.

Mr. Thompson's method might in most cases, and with considerable advantage, supersede them all. Whether the line of road rises or falls, much or little, is level or undulating, matters not; the carriages, loaden or empty, are made to pass in both directions, with a uniformity of progress, and at the same time with a despatch not heretofore known. A road on which this invention is to be applied, must be divided into stages, attention being given in determining their distances, to the nature of the line, in regard to curves or bends, and to the undulation of the surface. The nearer it approaches to a level, and the fewer, as also the easier, the bends are, the better will it allow of the stages being extended. On the other hand, should the line prove to be a very uneven one, with frequent and short bends, then the intervals or spaces, between stage and stage, will necessarily be required to be shortened accordingly.

The engines are severally to be furnished with two rope-wheels, and a rope to each, of a length and strength suitable to the stage upon which they are to be used. The rope-wheels must be so constructed as to

allow of a ready connexion, on the contrary, with their respective engines, so as to be capable of being acted upon by them, or of turning round, independently, at the will of the engine man. This may be readily accomplished by any one of the modes in use with millwrights for throwing machinery into or out of gear, with a moving power.

In cases of greater inequality of surface, the saving would be in a still greater ratio. A further and very important reduction in the cost of a new road would result from its adoption. In the formation of a road it is generally necessary to make deep cuts and raise high batteries, in order to obtain a uniformly rising, falling, or level surface; and it frequently happens, too, that the direct line of way must be materially diverged from to favour that purpose.

Mr. Thompson's plan dispenses with such nice attention to regularity, the engines being capable of surmounting acclivities, and the wheel which gives out the following, or passive rope, affording the means of restraining the too rapid progress of the wagons down a declivity. In short, there is no country, however uneven or variable its surface, but that may, by his method, be traversed. For conveying of minerals underground, where the unevenness of the strata and their general disposition to undulation do not allow of a uniformly ascending, descending, or level road, Mr. Thompson's invention is peculiarly applicable. His method of facilitating the conveyance of carriages along iron and wood railways, tramways, and other roads, consists in the reciprocal action of two engines, standing at the extremities of a stage, or portion of road to be travelled over, one engine drawing the carriages forward in a direction towards itself, and along with them a rope from the other engine; which rope, in its turn, pulls the same or other wagons, by means of the other engine, back again, and also a rope therewith; thus, by the alternately active and passive agency of two ropes, are the powers of fixed engines made to act in opposite directions, thereby causing a road to be traversed both ways, by loaden or empty carriages, and at any desired speed. It is the reciprocal and interchangeable application of power, as hath been described, which he claims as his invention.

Upon the wagon-way from Ouston Colliery, in the county of Durham, seven miles from Newcastle, leading to the river Tyne, four miles below that place, and in length seven miles and a quarter, a stage has been selected, upon which this new method of conveyance has been put in force. The distance of the two engines from each other is 2,315 yards; the upper end whereof is a steep inclined plane, 323 yards long, up which the carriages are drawn by the Ayton engine: and the remaining portion, which is 1,992 yards, has been heretofore worked by ten powerful horses, the ascent of it being 65¼ feet, but not a regular acclivity. The engine at the lower end was for the purpose of drawing loaden wagons up an inclined plane, extending 387 yards in the contrary direction, or towards the colliery.

Six loaden wagons, coupled together, carrying the same number of Newcastle chaldrons, or 15 tons 18 cwt. of coals, pass upward at a speed of 10½ feet per second, or seven miles an hour, with the greatest ease and certainty, affording a despatch by no means derived previously from the use of animal power. The two extremities, visible to each other, are furnished with flags, to give alternate signals of the readiness of the wagons to proceed. When the atmosphere is hazy,

and the flags cannot be seen, signals are made by drawing forward the rope three or four yards, with the engine, at that end from which the wagons are intended to go, and which is instantly perceived at the other end. And in the dark (for the work is daily prosecuted during five or six hours' absence of light at this period of the year,) signals are given by a fire kept at each end for lighting the workmen, which is shut from, or opened to, the view of the opposite extremity by means of a door. A person accompanies the wagons constantly, seated in a chair fixed securely upon the fore end of one of the soles of the leading wagon of the set, which is easily removed from one to another. The use of such attendant is to disengage the hauling-rope from the wagons, by means of a spring-catch, in the event of any sudden emergency, such as the breaking of a wheel or rail, or the hazard of running down any object, the stage in question lying over a common.

The methods of Blenkinsop, Chapman, and Brunton, (says Mr. Thompson in his observations in *the Repertory*,) are grounded on principles that supply the means of surmounting tolerable steep acclivities—all others depend on the resistance offered by the iron rails or plates to the surfaces of the wheels for the application of power to the purpose of locomotion; and it becomes an object, consequently, in those cases, to create as much friction as possible at the contraction of the wheels with the rails or plates. A quarter of an inch rise in every yard of way may, however, be considered as the greatest acclivity they can be rendered capable of overcoming with a load. The friction thus occasioned, and otherwise, together with the movement of the machine itself, causes so extravagant a dissipation of power as to leave, comparatively, but a small portion effective of that which the engine really applies; so that it is not safe to calculate on its yielding regularly more than about thirty-five per cent. of the force exerted. One supernumerary engine to every three, or at the most four, will be found necessary, together with the incessant and vigilant care of a superintending mechanic, to secure a tolerable degree of certainty. The application of fixed reciprocating engines requires no more than a single way; slidings or passings being necessary only at the stages, by which alone about a fifth of all the materials would be saved, for six sidings of seventy yards each are necessary in every mile of horseway.

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SKETCH OF THE PROCESS OF FRESCO PAINTING.*

Of all the modes of art made use of by painters, that species of wall-painting called *al Fresco* is the most masterly and beautiful; for by it may be accomplished in a single day, more than can be effected during several by any other method. It was much in use among the ancients, and the *old moderns* (*i vecchi moderni*) also followed it at an early period. It is done by working upon the fresh mortar, so that whatever is commenced must be continued and completed on the same day; because, by delaying it ever so little, the mortar forms a slight external crust, upon which mouldy spots are thrown out to the destruction of the work. The wall upon which the painter is employed requires to be continually moistened, and the colours must be of an earthy, not of a mineral nature, and the white of burnt tiburtine. No style of art

* From the Italian of Georgio Vasari, a cotemporary of the great Fresco Painters.

demands so resolute and swift a hand, or such a calculating and difficult judgment; because, while the ground continues soft and moist, the colours exhibit an appearance entirely different from that which they present when it is dry. Perfection in this branch of art is of most rare and difficult attainment, and requires an extraordinary degree of practice; for many of our painters who have succeeded wonderfully in oil and tempered colours, have almost entirely failed in Fresco. It is the most manly, the boldest, and most durable of all the modes of painting; and if preserved from violent accidents, and the inclemencies of the weather, so far from decaying through the mere lapse of time, it seems thereby to gain a continued increase of harmony and beauty. It becomes clearer by exposure to the air, defends itself from water and even withstands the effects of strong percussion. But especial care must be taken to avoid retouching with colours which contain glue, gum, dragant, or other tempering mixtures, because, besides that they prevent the wall cement from exhibiting its accustomed clearness, the colours are clouded by that retouching, and in a short space of time become almost entirely black. However, those who seek to excel in fresco painting, must work boldly while the plaster is fresh, and without any retouching *a secco*, that is, after it is dry; which, besides being a weak and un-artist-like thing in itself, renders the paintings worthless and perishable.

It is customary with artists before beginning a fresco painting to make accurate drawings of the subject upon strong card or pasteboard, which are called cartoons; and when the work is commenced in fresco, a single figure or piece of the cartoon is cut out and placed upon the newly-plastered wall, and its outline marked out on the place which the painted figure is intended to occupy, and thus the painter advances from day to day, and is able to judge of the proper relative position of all his figures without fear of error. The leading lines are also designed, by tracing the cartoon with a sharp-pointed iron instrument, which leaves a corresponding trace beneath on the moist plaster, and the pasteboard being then removed, the work of colouring is immediately commenced, and to a certain extent completed *at a heat*. The same method of tracing is used by some of our painters on wood and canvass, only the cartoons are never cut out in outline, but composed of entire portions or divisions, which are rubbed on the back with charcoal or black powder, and being traced in front with the iron instrument, the subject is thereby designed on the wood or canvass. Yet many of our oil painters never have recourse to this system; which, however, is reckoned indispensable in fresco painting. He who hit upon this invention showed an ingenious fancy, for in these previous cartoons the artist is enabled to judge of the effect of the whole together, and thus to alter and amend at will, a thing impossible after the commencement of the work in fresco.

We shall next say a few words regarding that mode of art, which the Italians call painting *a tempera*. This was chiefly in use among the painters of the Greek school prior to, and for some time after, the age of Cimabue. These old masters, to remedy the inconvenience arising from the disjoining of the wood on which they are generally painted, used to glue over its surface linen cloth or canvass, upon which they chalked out their drawing, and afterwards finished them with colours tempered after the following fashion. After beating up the

yolk of an egg, they bruised in it the tender branches of the fig-tree, so as to press out the milky juice with which they abound, and with this simple mixture they qualified or *tempered* the colours with which they were in use to paint. For this process mineral colours are chiefly employed, and these are partly composed by the chemists, and partly found in caves. Every colour is proper for this kind of work, except that species of wall-white made from lime, which is too strong. I may add, that the azure colours are tempered with gum or glue, because the yellow tone of the egg has a tendency to turn them green.

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THE HELIOTROPE.

A new Instrument invented by Professor Gauss of Gottingen.

When Professor Gauss was engaged, in 1820, at Lüneburg, in trigonometrical observations, to combine the Hanoverian with the Danish triangles, he perceived that when he directed his telescope towards the steeple of Saint Michael's church at Hamburgh, which was seven German (thirty-two English) miles distant, the little round window in the upper part of it reflected the image of the sun towards him, and thus impeded him in his operations. This gave him the idea of using the sun's light for signals, by catching it with a mirror and reflecting it to the place to which a signal was to be given. He made a calculation of the strength of the sun's light, and of the diminution which it suffers in the atmosphere; from which it appeared that a small mirror, only two or three inches in diameter, was sufficient to reflect the sun's image to the distance of ten or more German miles. This is the Heliotrope, which is described to be of great importance in the measuring of triangles, and as likely to supersede the methods hitherto employed. These consisted in placing, or fastening by night, several Argand lamps with reflectors, at those places which it was intended to observe from a great distance. This measuring by night is very inconvenient, and by day the light of the lamps is much too faint to be always seen at the distance of several miles through a telescope.

The inventor of the Heliotrope, on the other hand, had full proof of the great advantage to be derived from it when he was last year on the summit of the Brocken Mountain, to determine the three corners of the triangle for measuring the meridian in the north of Germany; on which occasion Professor Gauss gave signals with this instrument to his assistant, who was stationed at the distance of fourteen German miles from him, upon the Inselberg in the forest of Thuringin. We learn also that the experiments made on the new observatory at Gottingen on the 31st of October, 1821, in presence of the Minister Von Arnswaldt, were perfectly satisfactory.

But the great use of the Heliotrope is not confined to such operations. It will, it is stated, be found greatly to excel the telegraph for giving signals, and in time will probably supersede it. As the reflected image of the sun is visible at so great a distance, the signal stations may be much fewer. The mode of using it is likewise more simple, it being necessary alternately to show and to hide the mirror; the intervals, measured by a stop watch, are the signals. The difficulty, that the Heliotrope cannot be used by night, is the same in the telegraph. A more specious objection is, that it can be used only in bright

sunshine; but in dull weather the use of the telegraph is also very confined.

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Some Positions respecting the Influence of the Voltaic Battery, in obviating the effects of the division of the Eighth Pair of Nerves. Drawn up by A. P. Wilson Philip, M.D., F.R.S., Edinburgh. Communicated by B. C. Brodie, Esq., F.R.S.

Our high opinion of the importance of Dr. Wilson Philip's physiological researches may be judged of, by the space which we frequently devote to them in this journal. The short paper now before us appears to us to contain, along with several curious observations, two discoveries of the first magnitude, as connected with the laws of animal life; the first is, that when the nerves of the eighth pair are divided in the neck of a rabbit, *and the ends not displaced*, the animal being allowed to live for some hours, it was found that food swallowed immediately before the division of the nerves, *was considerably digested, even when the divided ends of the nerves had retracted to the distance of a quarter of an inch from each other.* When, however, the divided ends of the nerves *were turned completely away from each other, no perfectly digested food was found*, the animal having been kept alive as before. In an experiment, in which, under such circumstances, the stomach was exposed, from the time of the division of the nerves, *to the influence of a voltaic battery sent through the lower portion of the divided nerves, its contents were apparently as much changed as they would have been in the same time in the healthy animal.* If no source of error has crept into these inquiries, and we are told by Dr. Philip that the experiments were made with Mr. Brodie's assistance, and that, with respect to the results, Mr. Brodie agrees with him, (and we consider Mr. Brodie to be very high authority here) we repeat that Dr. Philip has established two entirely new and important physiological facts, sufficient to place him high among the discoverers of the age; the first is, that the nervous energy, or power, is not entirely interrupted or cut off when the nerve is divided, provided its divided ends be not forcibly and extensively separated from each other; the second, that electricity is capable, under certain circumstances, of causing the extremity of the divided nerve to maintain the most essential of those functions which it enjoyed in an undivided state.

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On a new species of Rhinoceros, found in the interior of Africa, the Skull of which bears a close resemblance to that found in a fossil state in Siberia, and other countries. By Sir Everard Home, Bart., V.P.R.S.

"It has been hitherto asserted (says Sir Everard), as one of the most curious circumstances in the history of the earth, that all the bones that are found in a fossil state, differ from those belonging to animals now in existence; and I believe that this is generally admitted, and that there is no fact upon record, by which it has been absolutely contradicted; but the observations I am about to state respecting this rhinoceros, illustrated by the drawings that accompany them, will go a great way to stagger our belief upon this subject.

"The skull of this rhinoceros was brought to England by Mr. Campbell, who shot the animal about 250 or 300 miles, up from the west-

ward of De la Goa Bay, six miles west of the city Mashow, and above 1000 miles in nearly a straight direction from the Cape of Good Hope.

"The country from whence this rhinoceros comes, contains no thick woods, or forests, but is covered with separate clumps of trees, like a nobleman's park in England. In travelling, you always appear to be approaching a wood; but as you advance, the trees are discovered to stand at a distance from one another, or rather in little clumps.

"This animal feeds upon grass and bushes; is not carnivorous, and not gregarious; seldom more than a pair are seen together, or in the vicinity of one another. Mr. Campbell's people wounded another of the same description. When enraged it runs in a direct line, ploughing the ground with its horn. The hide is not welted, is of a dark brown colour, smooth, and without hair."

Sir Everard then proceeds to describe the skull, and especially to point out its exact resemblance to the fossil skull from Siberia, whence he concludes—"That although many animals belonging to former ages may be extinct, they are not necessarily so; no change having taken place in our globe, which had destroyed all existing animals, and therefore many of them may be actually in being, although we have not been able to discover them."

Our author then adverts to the immense tracts of Africa which remain unexplored, and to the probability that they form the retiring places of animals not disposed to submit to the will of man; he quotes the following document to show in what way particular animals may elude our inquiry at one time, and at another be brought within our reach.

"Mr. Campbell says, he found that the wild ass, or quagga, migrates in winter from the tropics, to the vicinity of the Malaleveen river, which though farther to the south, is reported to be warmer than within the tropic of Capricorn, when the sun has retired to the northern hemisphere. He saw bands of two or three hundred, all travelling south, when on his return from the vicinity of the tropic; and various Bushmen, as he proceeded south, inquired if the quaggas were coming. Their stay lasts from two to three months, which in that part of Africa is called the Bushmen's harvest. The lions who follow them are the chief butchers. During that season, the first thing a Bushman does on awaking, is to look to the heavens to discover vultures hovering at an immense height; under any of them he is sure to find a quagga that had been slain by a lion in the night."

The author then goes on to draw a comparison between the docility of the elephant, the horse, and the rhinoceros, and refers the untameableness of the latter to the smallness of its brain; he concludes his paper as follows:

"The following account of the manners and habits of the Asiatic rhinoceros, clothed in armour, and having the welted hide, I have taken from the young man who was its keeper for three years in the Menagerie at Exeter Change, at the end of which period it died.

"It was so savage that, about a month after it came to Exeter Change, it endeavoured to kill the keeper, and nearly succeeded. It ran at him with the greatest impetuosity, but fortunately the horn passed between his thighs, and threw the keeper on his head; the horn came against a wooden partition, into which the animal had

forced it to such a depth, as to be unable for a minute to withdraw it, and during this interval the man escaped.

"Its skin, although apparently so hard, is only covered with small scales, of the thickness of paper, with the appearance of tortoise shell; at the edges of these, the skin itself is exceedingly sensible, either to the bite of a fly, or the lash of a whip; and the only mode of managing it at all was by means of a short whip. By this discipline the keeper got the management of it, and the animal was brought to know him: but frequently, more especially in the middle of the night, fits of phrenzy came on, and while these lasted nothing could control its rage, the rhinoceros running with great swiftness round the den, playing all kinds of antics, making hideous noises, knocking every thing to pieces, disturbing the whole neighbourhood, then all at once becoming quiet. While the fit was on, even the keeper durst not make his approach. The animal fell upon its knees to enable the horn to bear upon any object. It was quick in all its motions; ate ravenously all kinds of vegetables, appearing to have no selection. They fed it on branches of the willow. It possessed little or no memory, dunged in one place, and, if not prevented, ate the dung, or spread it over the sides of the wall. Three years' confinement made no alteration in its habits.

"The account in the Bible of an unicorn not to be tamed, mentioned by Job, bears so great an affinity to this animal, that there is much reason to believe that it is the same, more especially, as no other animal has ever been described so devoid of intellect. In that age, the short horn might readily be overlooked, as it cannot be considered as an offensive weapon, and the smoothness of the animal's skin would give a greater resemblance to the horse than to any other animal.

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On the Electric Phenomena exhibited in Vacuo. By Sir Humphry Davy, Bart., P.R.S.

Is electricity a subtile fluid, or are its effects merely the exhibition of the attractive powers of the particles of bodies? Are heat and light elements of electricity, or mere effects of its actions? Is magnetism identical with electricity, or an independent agent, put into motion or activity by electricity? Though these abstruse and difficult questions exceed our present means of solution, it appeared to Sir Humphry an object of considerable moment, and intimately connected with them, to determine the relations of electricity to space as nearly void of matter as it can be made upon the surface of the earth; his experiments on these subjects are detailed in this paper.

The most perfect mercurial vacuum that could be procured was permeable to, and rendered luminous by, electricity; when the tube was very hot the light was green and dense; as the temperature diminished it became less vivid, and at — 20° was scarcely perceptible, except in a very dark place. The ingress of very small portions of air rendered the light blue and purple, and increased the conducting power of the medium. In a vacuum above fused tin, the phenomena was nearly the same. From the general results of these experiments, it is inferred "that the light (and probably the heat,) generated in electrical discharges, depends principally upon some properties or substances belonging to the ponderable matter through which it

passes; but they prove likewise that space, where there is no appreciable quantity of this matter, is capable of exhibiting electrical phenomena; and, under this point of view, they are favourable to the idea of the phenomena of electricity being produced by highly subtile fluid or fluids, of which the particles are repulsive, with respect to each other, and attractive of the particles of other matter. On such an abstruse question, however, there can be no demonstrative evidence."

This paper contains many valuable hints respecting the existence of air in mercury, and the best means of obtaining a vacuum free from it, which seem of considerable importance in their relation to the construction of barometers.

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M. M. Gay Lussac and Welter are occupied at present with the heat disengaged by the gases, when their volume is made to vary under very different pressures. They have already obtained several results, which they propose to submit to the Academy of Sciences, when their labour shall be more complete; but meanwhile they have thought it right to communicate a fact which appears to them very singular.

It is known that when we dilate air, or any other elastic fluid, by enlarging the space in which it is enclosed, cold is produced. The fact observed by these gentlemen is announced in the following proposition: "The air which escapes from a vessel in blowing through an aperture, under any pressure whatever, does not change the temperature, although the air is dilated in issuing from the vessel."

It would seem to result from this, that there is heat produced in the blowing of the air, and that this heat is as much more considerable as the difference of pressure which produces the blast is greater; so that the heating compensates exactly the cold produced by the dilatation. This fact would explain why heat is produced when air enters into a void space, or one occupied by air at a smaller pressure. It would explain also why the blast of the machine with the column of water at Schemnitz produces cold and congeals water; whilst the blast of the reservoir of air of the steam-engine at Caillot, where the pressure is constant, and of 2.6 atmospheres, does not affect the thermometer.

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Description of a Ductilimetre, or an Instrument for comparing the Ductility of different kinds of Lead, Tin, &c., described in the *Annales des Mines*, tom. vii.—This instrument is the contrivance of M. Regnier, and is said to furnish an useful means of trying different samples of lead and tin, more especially with a view of judging of their fitness for lamination. It consists of a mass of iron of a given weight, attached to the extremity of an iron lever, thirty inches long. The other end of this lever is moveable upon a transverse axis. When the hammer is elevated to a certain angle which may be measured upon the quadrant of ninety degrees, it may be let fall upon the steel anvil which is attached to the small table upon which the whole is fixed.

In using this instrument, the different kinds of lead are cast into bullets of twenty-six to the pound, having a diameter of four-tenths of an inch; these are carefully smoothed and placed in the centre of the

anvil, upon the surface of which are engraved several concentric circles; the hammer is then elevated to 50°, and let fall upon the ball under examination, which becomes flattened by the successive blows into a disc of 1.2 inches diameter. The number of blows given to each ball, in order to produce this extension, are counted. The following table shows the results of some of these trials:

Samples.	Number of Blows.
1 Old sheet lead	12
2 New lead in pigs (W. Blackett)	11
3 Ditto (Blangill)	11
4 Ditto (Caldebek)	12
5 New sheet lead	12
6 Old lead of ten fusions	10
7 Cuttings of lead	12
8 Lead, with one-tenth of zinc	14
9 Tin	40

It appears that lead, ten times remelted, instead of being injured, is improved in quality; that lead mixed with one-tenth of zinc is very sensibly hardened, and that the hardness of the best English tin is to that of the softest lead as four to one.

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Strength of Cast Iron.—The increasing use of cast iron as a substitute for wood in building, has lately drawn considerable attention to the various circumstances affecting its strength and durability. Upon these subjects some interesting and important facts will be found in Mr. Tredgold's practical essay upon the above subject. We may daily observe among the new buildings of the metropolis, entire houses which are stilted, as it were, upon iron columns, with a view of gaining space upon the ground floor; and in many large buildings, the beams and roofs are entirely of iron, to the complete exclusion of all timber; it gives safety against fire, is not liable to sudden decay, nor soon destroyed by wear and tear; and it can be easily moulded into the form of greatest strength, or that best adapted for the intended purpose. It must, however, be remembered, that iron varies extremely in quality; that the method of casting materially affects its strength; and that this is also greatly dependent upon many minute circumstances, which in ordinary cases are not attended to: such, for instance, as the exclusion of air-bubbles; the temperature of the moulds; and above all, the time allowed for cooling, which, when performed very slowly, affords a much tougher material than when effected too rapidly. This *annealing* of cast iron, we believe, is frequently neglected, and we can speak from experience of its high importance. The best test of the quality of a piece of cast iron is to strike the edge with a hammer; if it make a slight impression, denoting some degree of malleability, the iron is of a good quality; but if fragments fly off, without any sensible indentation, the iron will be hard, brittle, and not to be relied on. It must, however, be remembered, that in a large beam of iron, different parts will often have different qualities, depending generally upon their situation in the mould. We recommend Mr. Tredgold's book, as calling the attention of practical men to these and several other important subjects, which they are too apt to leave to the honesty or care of the iron-founder, but upon which

every architect, engineer, and builder ought to be able to judge for himself.

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Steam Engine Chimneys.

To the Editor of the Journal of Science, &c.

Sir,—In a former number of your Journal, (No. 24, p. 352,) a suggestion is thrown out, that chimneys, in other respects equal, emit smoke in quantities greater or less in proportion to their height.

The object of this communication is to furnish you with a more direct illustration of the truth of that remark, than either of the examples cited in the Journal affords.

In passing through the town of Durham in the winter of 1815, my attention was attracted by a chimney of unusual height, situated at some distance from the town, and on the opposite bank of the river. Upon inquiry, I learned that this chimney belonged to a steam-engine, employed in a coal mine, and that it had been erected some years before, under the following circumstances:—

The engine had formerly been provided with a chimney of the ordinary kind, from which such volumes of black smoke were discharged, as to render it, when the wind blew in a particular direction, an intolerable nuisance to the town.

When, therefore, the lease expired of the ground upon which the engine was erected, the Dean and Chapter (to whom the ground belonged,) refused to renew it except upon the condition, that a chimney should be erected so high as to carry the smoke completely clear of the town. The condition was acceded to; and a chimney was in consequence built, the summit of which was elevated upwards of one hundred feet above the fireplace. The experiment was completely successful, but not exactly in the manner which had been contemplated; for the town was relieved, not so much by the smoke being carried to a greater elevation than formerly, as by the change which was produced in the quantity and quality of that actually emitted.

Nor had the proprietors any reason to regret the expense to which they had been put in erecting the new chimney; for the quantity of coal consumed by the engine was (as my informant stated) much less than formerly, and the consumption was so perfect, as to render all cleansing of the flue unnecessary.

As the preceding account was received on the spot, and from a person employed in the works, it may, I believe, be considered as in general accurate; but as I cannot vouch for that accuracy from personal experience, I beg leave to suggest the propriety of inviting some inhabitant of Durham to corroborate or to correct the statements it contains. M.

The smoke-burning schemes have all ended in smoke, as we ventured to anticipate would be the case in the article to which our correspondent M. alludes. There can be no doubt that no large engine in the metropolis, or near houses to which it can prove a nuisance, should be suffered to be erected without a chimney at least one hundred feet in height from the ground.

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The Manufacture of Wine improved by Chalk.—Count Alexander Czacki, after an experience of four years, recommends the addition

of a little chalk to the *must* of grapes, when it is somewhat sour; for the acidity being due to citric and tartaric acids, there is thus formed a precipitate of citrate and tartrate of lime, while the *must* becomes sweeter, and yields a much finer wine. Too much chalk may render the wine insipid, since it is proper to leave a little excess of acid in the *must*. He concentrates his *must* by boiling, and adds the proper quantity of chalk to the liquor, while it is still hot. Even acid wine may be benefited by the addition of chalk. Oyster-shells, we believe, have been frequently used with this view; and calcined oyster-shells are a cleaner carbonate of lime than common chalk.

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Test for Magnesia.—In the *Annales de Chimie* for May last, it is stated, that if we spread any clear liquid upon a plate of glass, and then trace the word *Magnesia* upon the glass so covered, with the end of a glass rod, that word will appear in *white characters* if magnesia be present in the solution; if not, no such appearance will result.

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Green Fire.—In a former number of this Journal we presented our pyrotechnical readers with a recipe for the *red fire* which has lately gained so much celebrity in the theatrical representations of conflagrations, and which forms so beautiful a change in fireworks. We now give them the component parts of a more modern invention, which has long been a desideratum in this branch of art, namely, a *green fire*, and which, when burned in a reflector, sheds a beautiful green light upon all surrounding objects; it may also be employed in the changes of fireworks alternating with red and blue fire. Take of

Flowers of sulphur . . .	13 parts
Nitrate of baryta	77
Oxymuriate of potassa . . .	5
Metallic arsenic	2
Charcoal	3

The nitrate of baryta should be well dried and powdered; it should then be mixed with the other ingredients, all finely pulverized, and the whole triturated until perfectly blended together. A little calamine may be occasionally added, in order to make the compound slower of combustion; and it is above all things requisite, that both in this and the red fire the trituration of the materials should be continued until they are completely mixed.

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Effect of Voltaic Electricity upon Alcohol.—M. Lindersdorff produced an ethereal fluid by the action of the voltaic pile upon alcohol; and by continued electrization, a mixture of equal parts of alcohol and liquid ammonia lost its inflammability, and acquired a bitter flavour, yellow colour, and nauseous odour. On evaporation it left a greasy residue.

These are very interesting results.

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Considerations on the existence and state of Sulphur in Vegetables.—M. Planche suspended a piece of rag, impregnated with acetate of lead, and also a plate of clean copper, within the capital of an alembic in which he was drawing off distilled waters from plants, and found that the above re-agents were powerfully acted on, as if they

had been exposed to a stream of sulphuretted hydrogen. He found, moreover, that water and sulphur boiled together, as also roll sulphur heated, without the addition of water, evolved sulphuretted hydrogen; and from the two latter experiments he infers, that in plants the sulphur is in its simple state.

According to MM. Thibierge and Robiquet, the oil of mustard contains a pretty large quantity of sulphur; and from some comparative trials, it seems there to be in the state of sulphuretted hydrogen. In fact, distilled water, saturated with the essential oil of mustard, blackens the solution of nitrate of silver. Oil of caraways absorbs a very large quantity of sulphuretted hydrogen gas, when it is passed through it; and assumes, in consequence, a very fetid odour. He supposes that the sulphur which exists as such in the mustard-seed, is converted into sulphuretted hydrogen during distillation with water, and in this state unites to the oil. A portion of the sulphur is deposited at the end of some days. The following plants yielded much sulphur: the flowers of the elder, linden, and orange-tree; the whole plant of pellitory and mercury; the flowering tops of hyssop, melilot, tarragon, and rue; the seeds of dill, caraway, cummin, and fennel; and clove-buds.

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Detection of Poisons.—A paragraph has appeared in the papers, recommending blue sugar-loaf paper as a test of distinction between oxalic acid and Epsom salt; it is reddened by the former, but not affected by the latter. This is perfectly true; but a simpler test consists in wetting the tip of the finger, applying it first to the supposed salt, and then to the tongue—if oxalic acid, it tastes *very* sour; if Epsom salt, very bitter and saline.

Many restrictions have been suggested upon the sale of arsenic; the only effectual bar to the mischief that results from it, is *prohibition*. It is of no use in medicine, and should therefore be rejected from the pharmacopœia. Apothecaries and druggists need not then keep it. It is sometimes employed as an instrument of research, in the chemical laboratory, which might be sufficiently supplied through other channels.

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Bezoars voided by a Woman.—The calculi called bezoars are found in the stomach and intestines of certain herbivorous animals, but had not been met with in those either of carnivorous animals or of man, until Dr. Champion, an eminent physician of Bar-le-duc, sent some for analysis to M. Henri Braconnot, which had frequently been voided, in a diurnal vomiting of blood, by an unmarried woman, whose menstruation was irregular, and whose urine had become much diminished in quantity before the evacuation of these concretions commenced.

These bezoars have the form of crisp almonds (*pralines*) and are as large as small hazel nuts; their surface is tubercular and coloured brownish red by the blood. Internally they are of a yellowish white, inclining to fallow, and appear to consist of brilliant crystalline grains; they do not present any concentric layers. They are usually of a close texture, but are sometimes cellular, like the marrow of bones; and may be cut with a knife like wood, of which they have also the aspect. At one of their extremities there is an infundibuliform de-

pression, often filled with dried blood, which communicates with a tube extending throughout their length; this tube being sometimes partially or even wholly filled up. Two of them had cavities in the interior, like little geodes, but none offered a distinct nucleus; their specific gravity was above that of water.

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Electro-Magnetic Eperiment.—M. Nordenskiold, of Abo, now in this country, has communicated to me, the following curious and simple experiment of Dr. Seebeck, of Berlin.—Take a bar of antimony about eight inches long, and half an inch square, connect its extremities by twisting a piece of brass wire round them so as to form a loop, each end of the bar having several coils of the wire. If one of the extremities be heated for a short time with a spirit lamp, electro-magnetic phenomena may be exhibited in every part of it.

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Royal Academy of Sciences in Paris.—July 1. A report was made on a curious fact of vegetable physiology communicated by M. D'Hombres-Firmas. Vegetables, except a small number, and especially trees, do not flower or bear fruit till after a certain growth; and the leafing precedes the flowering. The observation communicated relates to two fine bunches of lilac, on the ground, which M. Villaret took at first sight for bunches detached from a neighbouring tree, and planted in the ground by children, but which he found to be rooted. The reporter considers the fact as very important.

July 15. M. Cuvier delivered a highly favourable report in the name of a commission upon the memoir of M. Fleureus, entitled "Researches relative to Sensibility and Irritability." The object of these researches has been to ascertain by a series of experiments, whether the sensitive and the motive powers reside in the whole nervous system, or each in distinct parts of it. And the interesting result appears to be, that in the nervous system there are two properties essentially distinct: the one, to excite muscular contractions; the other to receive impressions. It has been the object of M. Fleureus to discover, by isolating and detaching the several parts of the brain and nervous system, in which of them these properties severally reside.

M. Cordier has been nominated to fill the place left vacant in the Sections of Mineralogy by the lamented death of M. Haüy; and M. Brougniart has been elected to succeed him as Professor at the Museum.

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Linnæan Society of Paris.—M. Viellot gave an account of an eagle never yet described, killed in the Forest of Fontainbleau, and which he proposes to call *Aquila fasciata.*

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Wool employed in the Manufactures of France.—"Formerly, and even to the present time, the clothiers sought out for long and sound wools, in the expectation of finding in them, proportionally less of grease and foreign matter, and more freedom in the staple, but also with a view of giving more strength and firmness to their cloths. The very reverse now takes place. In order to maintain a competition with the cloths of England, they require only such wools as are short, weak, and silky: and they manufacture only fine and slight

cloth, soft and silky, which will scarcely last so long as the transient taste which has given rise to them.

"This predilection has produced a change in our flocks; and the grower of the raw material, who seeks for a ready sale, has been compelled to conform to the desires of the manufacturers and the depraved taste of the consumer. In order to diminish the length of their wool, they have been tempted to shear their sheep twice in the year, allowing seven months for the first growth and five for the second: but, besides that, it is only a small number which is capable of yielding twice in the year a wool of sufficient length; the prospect of reaping advantage from animals twice in the year, submitted to the shears, seems more than doubtful. The experiments made by M. Bourgeois, on his estate at Rambouillet, leave no doubt on this subject."

If the above facts (taken from the *Bibliotheque Physico-Economique*) are to be depended upon, they are worthy the attention of the English clothier, who will perceive that the French clothier has had recourse to a change in the wools consumed in his manufacture, with a professed view of maintaining a rivalry with English cloth.

On preserving Fish by Sugar. In a letter to Dr. Brewster from J. Mac Culloch, M.D. F.R.S, &c. Communicated by the Author.

Dear Sir,

As you have not scorned to give your readers a useful notice respecting the preservation of meat by the use of vinegar, you may possibly not refuse to add to it some remarks on the curing of fish by means of sugar. This is a very antiseptic substance, as is well known; and though partially employed in hams, it is scarcely considered, as what it really is, one of the most active substances in their preservation, being rather employed blindly, and with the notion of giving flavour. It is highly deserving of a much more extended trial, particularly the curing of meat for the Navy; as it does not, like salt, destroy the provisions, and as it is in itself nutritious.

But to return to the subject of this notice: Fish may be preserved in a dry state, and perfectly fresh, by means of sugar alone, and even with a very small quantity of it. I have thus kept salmon, whitings, and cod, for an indefinite time, and with the best effect; an experiment which I was led to try in voyaging among the Western Islands, where matters of this nature are often of considerable moment.

Fresh fish may thus be kept in that state for some days, (but I know not how long,) so as to be as good when boiled as if just caught. If dried and kept free from mouldiness, there seems no limit to their preservation; and they are much better in this way than when salted. The sugar gives no disagreeable taste.

This process is particularly valuable in making what is called Kippered Salmon; and the fish preserved in this manner are far superior in quality and flavour to those which are salted or smoked. If desired, as much salt may be used as to give the taste that may be required; but this substance does not conduce to their preservation.

In the preparation, it is barely necessary to open the fish, and to apply the sugar to the muscular part, placing it in a horizontal position for two or three days, that this substance may penetrate. After this

it may be dried; and it is only further necessary to wipe and ventilate it occasionally to prevent mouldiness.

A table spoonful of brown sugar is sufficient in this manner, for a salmon of five or six pounds weight; and if salt is desired, a tea spoonful or more may be added. Saltpetre may be used instead, in the same proportion, if it is desired to make the kipper hard.

—

In his "Memoir on the fall of Leaves," M. Vaucher objects to the hypothesis that attributes the fall of the old leaf to the growth of the new bud; to that also which ascribes it to an alleged superabundance of juice in the plant, and defective transpiration; or to the inequality of growth between the circumference of the stem and the petiole of the leaf. The true cause, he supposes to consist in a peculiar structure that obtains at the insertion of the petiole with the stem. The fibres of the petiole, instead of being a simple prolongation of those of the stem, are, according to him, distinct from them. At the point where the separation of the leaf occurs, there is only a sort of approximation, or soldering, and not a real continuity of vessels. This soldering is supposed to be produced by the interposition of parenchyme between the two systems of vessels. As long as this parenchyme is supplied with juices, and retains its vegetative power, the adherence of the petiole is maintained; but when it begins to dry, the connexion fails, and the leaf falls.

As this hypothesis is made to rest on *anatomical* grounds, we could have wished that M. Vaucher had exhibited something like a *demonstration* of the structure of these parts. He mentions, indeed, the existence of a circular ring or rising, visible exteriorly, at the place of junction of the petiole with the branch; but that this is caused by the interposition of cellular tissue between the vessels of the stem and petiole, or by any sort of soldering of the extremities of these vessels with one another, we have no evidence. We incline rather to the old opinion, that these vessels are truly continuous; and consequently, that whatever be the cause of the fall, it is accompanied by a rupture of vessels. That a diminution or cessation of vegetative power in the part precedes this event, has been generally deemed probable; though others, as M. Vrolick and Sir J. Smith, consider the fall of leaves in autumn as a sloughing of worn-out parts, effected by the vital energy of the parts in contact with them.

—

Curious appearance observed on the Moon at the Cape.—The Reverend Fearon Fallows, the astronomer at the new observatory erected at the Cape of Good Hope, observed with his naked eye a whitish spot on the dark part of the moon's limb. This happened on the 28th November, 1821, about 8 o'clock, P.M., when the moon was shining with a brilliancy which he had never observed in England. This spot seemed now and then to flash with considerable lustre. With an achromatic telescope about 4 feet long, magnifying 100 times, the spot seemed like a star of the sixth magnitude, and there were *three others* much smaller, but *one* of these was more brilliant than the one he had seen with the naked eye. The largest spot was surrounded by a nebulous appearance, but nothing of this kind was observed about the small brilliant spot. The two others were similar to faint nebulæ, increasing in intensity towards the middle, but without any defined luminous

point. As the telescope with micrometers had not yet arrived at the Cape Observatory, Mr. Fallows had not the means of determining the exact position of these spots. On the evening of the 29th November, the large spot was fully as bright as before, two others were nearly invisible, and the small brilliant spot had disappeared.

—

Singular contrast between the Winter of 1821–2, *in the north of Europe and South America.*—No fact in meteorology is more remarkable than the mildness of last winter in the north of Europe and Asia, and its severity in South America. The winter at St. Petersburgh, which is always very severe during four successive months, and continues two months more, so as to last *six* months, lasted only about a month and a few days. The first snow fell at Christmas, and it disappeared generally on the first day of February. Although the weather in the interior of Russia was colder and more constant than at St. Petersburgh, yet there was no snow, and the frost did not commence till the middle of January. On the 2d March, the Dwina was free of ice at Riga. The winter in Siberia was equally mild. Warm winds prevailed both at Tobolsk and also farther to the north-east. Every where there was no snow. At Beresoff, one of the most northern of these districts, it rained abundantly on the 8th December, a circumstance which had never occurred in the memory of the oldest inhabitants.

Near Buenos Ayres there fell in the month of December, 1821, such a quantity of snow, that the communication between that city and Lima was entirely interrupted. The cold which prevailed in the different parts of South America is a most extraordinary phenomenon, and the inhabitants of Peru and Chili have considered it as a true calamity.

—

Dr. Fleming's Zoology.—We have long regretted the want of a scientific, and at the same time popular view of the leading facts in zoology. On the continent, it is true, some philosophers have published general statements in regard to the facts and reasonings of zoology, but hitherto all the works published in England have afforded but a limited and often incorrect account of the subject. It is, therefore, with much pleasure and satisfaction, that we announce to the public the appearance of a work by Dr. Fleming, in two volumes octavo, entitled, *Philosophy of Zoology*, which we have no hesitation in recommending to the particular notice, not only of the professed naturalist, but also of the general reader, as a successful arrangement of the known facts and views of one of the most difficult and interesting branches of natural history. It also contains several ingenious and original views, and many new facts, the result of our author's own extensive researches.

—

Diffusion of Natron.—The existence of natron in the midst of plains, in the waters of lakes and marshes which cover them, is one of the most interesting facts in geology. It is not in Hungary only that this phenomenon presents itself; we find it every where in the midst of the vast deserts which occur in so many places on the surface of our globe. All that we know of this mineral production in Egypt, in Arabia, in Persia, in India, in Thibet, in China, in Siberia, in the plains of the Caspian and Black seas, in Asia Minor, and at Mexico,

evinces that every where it occurs with the same relations, and in the same circumstances; every where is it found in the midst of sands mixed with marl and clay, and is accompanied with many other salts, of which the most constant is common salt.

—

Mr. Cavallo seems to have been the first person who found, that red hot iron had a greater power over the magnet than cold iron. Captain Scoresby has more recently determined, that hot iron receives more magnetism of position than the same iron does when cold, a red hot bar producing a deflection of 77°, whereas it was only 15° when cold.

—

Odessa.—In this town in the year 1792 a hut was not visible, but there are now 40,000 inhabitants; Russians, Germans, French, Greeks, Jews, Americans, and Polanders. A French and an Italian theatre are built, and a lyceum, founded by the Duke of Richelieu, furnishes ample resources to the learned. There are, besides, several schools for law, navigation, and commerce; eight churches, 2000 houses, and numerous public buildings. The harbour is two *verstes* in length. In summer a number of Russian and Polish families visit Odessa for the purpose of sea-bathing, which is there remarkably convenient and healthy: the population of the environs is rapidly increasing.

—

The Greek seminary, founded in 1775, by Catherine II. at St. Petersburgh, becomes daily of higher importance; two hundred young Greek and Albanian officers are thus educated; they have twenty-five professors. Besides the military sciences, they are instructed in French, Italian, and German, and when they have completed their education, they may have the choice of a commission in the army, of becoming interpreters at the colleges of St. Petersburgh or Moscow, or of returning to their native country. Among the pupils now educating, there are several youths from Chio, Lesbos, and Naxos.

—

Fine Arts.—The Duke Albert, of Saxe-Teschen, has left, by a codicil in his own hand-writing, his rich collection of works of art to be possessed entire by a prince of the imperial family. It contains above 300,000 engravings from the very commencement of the art to its present high state of perfection, 82,000 portraits, and above 40,000 original drawings. This is the finest and most extensive collection in Europe.

—

M. Farkas de Farkasfalva, at Futak, has invented a machine by which a person may plunge to the bottom of the sea, walk at the bottom, work with the hands or feet, ascend easily to the surface, or stop in the middle, without any help; and in this manner remain several days under water, without interruption and without effort. The inventor calls this machine the dolphin, and pretends that it has many advantages over the diving bells. This machine, which only costs about 90*l.* and only employs two men, would be useful in shipwrecks, in regaining any thing dropt into the sea, and in facilitating pearl and coral fishing; an experiment the author made last year at Vienna, in the presence of Count Joseph Esterhazy and other persons of distinction, had the greatest success. To procure this machine, and to

have directions for using it, the inventor at Futak, through Buda, must be applied to.

—

The Chevalier Theodore Carezzini, a Piedmontese, has invented two kinds of round tables, which he calls geocentric and heliocentric; by which you may, without understanding mathematics, in a little time, perfectly well know the course of the stars, and explain celestial phenomena; you may also, in a few minutes, in the open air, find the meridian line; and in a journey by land, always discover the North.

—

Mr. Thomas Dale, B. A. of Corpus Christi College, Cambridge, author of the "Widow of the City of Nain," is preparing for publication, a new translation of the Tragedies of Sophocles, the object of which has been, to render the various metres of the Greek Tragedian by measures, as nearly corresponding with the original as the genius of the English language will permit. The work will be comprised in two volumes, octavo, and is expected to be ready for publication early in the ensuing spring.

—

The celebrated Lexicon of Protius, of which an edition was published at Leipzig, from a faulty manuscript, in 1808, is now, for the first time, printing under the auspices of the Society of Trinity College, Cambridge, from the celebrated Codex Galeanus, or rather from a corrected transcript of the Codex Galeanus, made with his own hand by the late Professor Porson. Mr. Dobree, the editor, has collated the MS. and noted all the varieties and corrections; and, by way of appendix, has subjoined a fragment of a rhetoric lexicon from a MS. in the University library.

—

The Rev. Thomas H. Horne, M. A. has in the press a third edition of his Introduction to the Critical Study and Knowledge of the Holy Scriptures, in four volumes, octavo, corrected, and illustrated with numerous maps and fac-similes of biblical manuscripts; it is expected to be ready in the course of November next. At the same time will be published, with one new plate, a small supplement to the second edition, (of which a limited number only will be printed) so arranged as to be inserted in the respective volumes without injury to the binding.

—

Anatomy of the Brain.—A new periodical work has been just published, entitled, "Anatomical and Physiological Commentaries, by Herbert Mayo, Surgeon and Lecturer on Anatomy." Our readers will here find a translation of Keil's *Essay on the Structure of the Brain*, which, although scarcely known in this country, appears to possess the highest interest and importance; we are, therefore, glad to see them at length introduced to the English reader.

—

Homer.—After an interval of about twenty years, that magnificent classical work, Tischbein's Illustrations of Homer, from ancient monuments, has been resumed; the Seventh Number, forming the first of a new series, having lately appeared. It contains six subjects, five of which have been till now unedited. The only one hitherto published is the celebrated Tabula Iliaca, which is here given of the exact

size of the original, a cast having been made expressly for this purpose, and with the utmost exactness. On the interest of such a work, and the value to philology, it is needless to dwell; it is enough to remark, that M. Schorn, the writer of the accompanying text, is in every respect a worthy successor to the illustrious Hayne. The archæological erudition, and the superior taste uniformly displayed, will render this work a most honourable monument of that zeal for classical literature by which Germany has been long distinguished.

—

Count Cicagnara, the author of the excellent *Storia della Scultura*, and president of the Academy of Fine Arts at Venice, has published an extensive Catalogue Raisonné of his library, one of the richest in the world in works of engravings and graphic literature. This collection has been enriched with the rarest articles of this description from some of the most distinguished libraries in Europe, for its possessor spared neither pains nor cost in amassing whatever related to the fine arts. The Catalogue is divided into forty sections or classes, and contains remarks on each article, pointing out its rarity, the value of the editions, the merits of its embellishments, &c. &c. all of which render it truly valuable to those who study the bibliography of the fine arts. Under the head of *Ingressi, Trionfi, Feste, &c.* there are no fewer than 200 articles; and relative to the single subject of ancient and modern Rome, about 300.

—

Mineralogy.—A work on the science of mineralogy is about to make its appearance in Germany. It is from the pen of Mr. Frederick Mohs, Professor of Mineralogy at Fryberg, and will contain the terminology, the rules of the construction of Mr. Mohs's system, and the nomenclature, the characteristic and the descriptive part of natural history. The whole to be comprised in two volumes octavo, with plates.—An English translation will appear at the same time, made under the inspection of the author, by Mr. Haidinger, who lately visited this country, in company with Count Brenner. From the known celebrity of the Fryberg school, as well as the acknowledged ability of the author, we have reason to expect that this will be a useful work.

—

Mr. Physick, sculptor, will publish twelve Subjects on Utero-gestation, which he has modelled from the originals of the late Dr. Smellie, and which are now in the possession of H. G. Clough, Esq. These models are coloured from nature, and will be opened for inspection every Monday and Thursday, (commencing the 3d October,) between the hours of two and four, at 23, Spring-street, Portman Square.

A Treatise on Dislocations and Fractures of Joints. By Sir Astley Cooper, Bart. T.R.S. 4to. With plates.

Dr. John Boron is about to publish, Illustrations of the Inquiry respecting Tuberculous Diseases, with coloured engravings.

Joseph Swan, Esq., has in the press, an Inquiry into the Action of Mercury on the Living Body.

Mr. W. Wallace, Surgeon and Lecturer on Anatomy, is printing a System of General Anatomy, in an 8vo. volume.

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☞ At page 116, the article on the Courts of Love is erroneously given to the Edinburgh Philosophical Journal, instead of the Retrospective Review.